MiG-17 FRESCO in action

Aircraft Number 125

squadron/signal publications

MiG-17 FRESCO
in action

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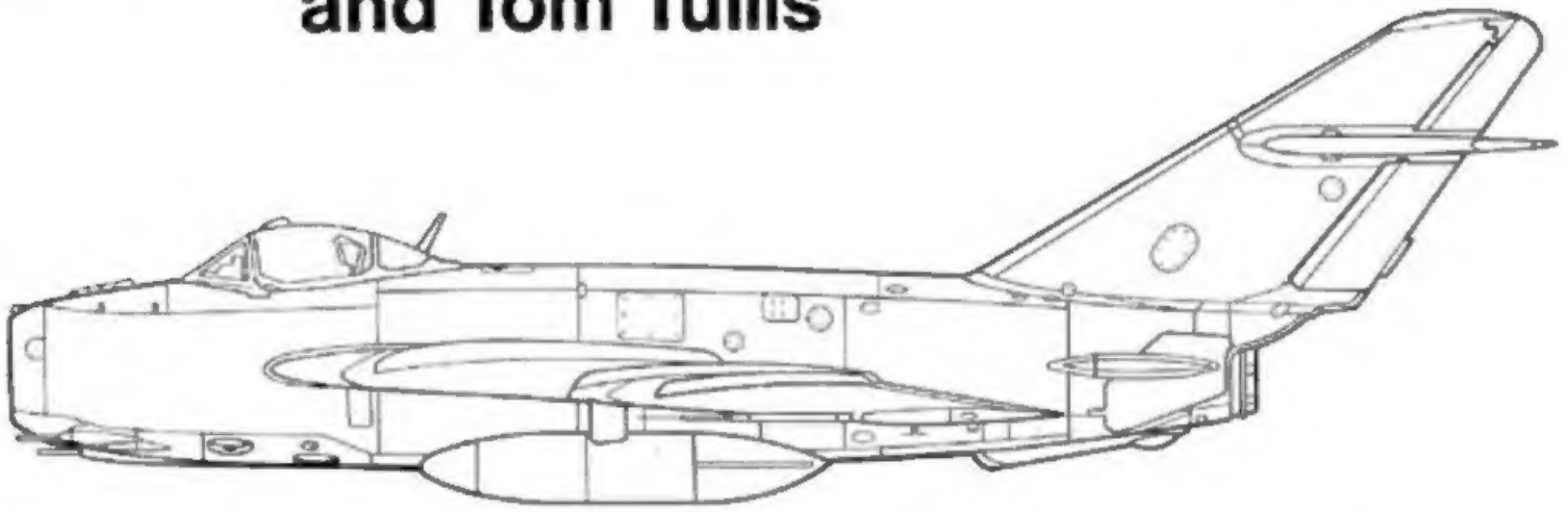

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A MiG-17F Fresco C of the North Vietnamese Air Force goes into afterburner in an attempt to intercept a USAF Republic F-105 Thunderchief over North Vietnam. American fighter pilots found the MiG-17 to be a maneuverable dog-fighter not to be taken lightly.

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Dedication

For all people who like Rock and Roll and beer. Music from such great bands as Saxon, Deep Purple, Motörhead, Uriah Heep, Led Zeppelin and AC/DC. What else can make you more happy than a nice cold beer and some great Rock and Roll played hard and loud (of course there is a price — a terrible hangover and aching ears the next morning).

The MiG-17 was an outstanding aircraft for its time: maneuverable and easy to maintain. The MiG-17PF was the first all weather interceptor to see service with the Soviet Air Force and WARSAW Pact nations. This East German Fresco D, Red 458, was actually a Polish-built MiG-17PF designated the Lim-5P.


458

Introduction

The MiG-17 Fresco followed the MiG-15 Fagot into Soviet Air Force service and evolved into a highly maneuverable, reliable and easy to maintain air combat fighter. The Fresco was one of the most widely exported fighters of all time and saw service in Europe, the Middle East, Africa and Asia, seeing combat in a number of conflicts. During the Vietnam war, the MiG-17F was respected by U. S. pilots flying faster, heavier aircraft of a newer generation. They quickly found out that the extremely maneuverable, cannon armed Fresco C was a formidable opponent in air-to-air combat. Based on reports of air engagements over Vietnam, the MiG-17 had an influence on future American fighter designs. The cannon armament of the MiG-17 proved that gun armament for fighters was far from obsolete, a lesson fighter pilots brought home from Vietnam and impressed on the designers of the next generation of U. S. combat aircraft (the F-14, F-15 and F-16 all have cannon armament).

Even forty years after its maiden flight, the MiG-17 is still in operational service with a number of air forces around the world — proof that the Fresco is a reliable and sound design.

During the late 1940s, the Cold War between the Free World and the Soviet Union escalated. In 1948 the Soviet Union stopped the supply of material to Berlin through the Soviet Sector of Germany. Thanks to the Berlin Airlift, Stalin's bid to drive the Western powers out of Berlin was unsuccessful. The situation continued to worsen when the USSR and China signed a Friendship and Cooperation Pact in February of 1950.

During this period, the Soviet Union made great strides in developing new combat aircraft which were equal in performance to those built in the West. These included the MiG-15, which flew for the first time in December of 1947 and was cleared for mass production a year later.

Operational trials with the MiG-15 revealed that the aircraft had a number of shortcomings, especially in its handling characteristics in high speed flight. These concerns were carefully analyzed by the MiG-OKB, but by this time MiG-15 production was well established and, in order to build as many new fighters as possible, the production line was not interrupted to introduce the modifications needed to solve the handling problems encountered during high mach number flights.

The most severe problems centered around the aircraft's handling and included: loss of directional control at high Mach numbers, poor lateral directional stability at high altitudes, a low roll rate and poor control responses at high indicated airspeeds. Another problem centered around the rather ineffective speed brakes and poor wheel brakes. The aircraft also had a tendency to stall easily with unpredictable control responses to the stall (direction of stall turn depended on speed and altitude). This problem was considered extremely serious, since it resulted in temporary loss of control and could be disastrous if it occurred at low altitudes.

MiG-15LL (Project SE)

During 1949, the first trials aimed at breaking the sound barrier with the MiG-15 took place. According to Soviet operational manuals, the top speed of the MiG-15bis was limited to Mach 0.92. A design team under the lead of I.M. Pashkowskij and M.I. Masurskij begun a program to modify the MiG-15bis to reach Mach 1.

A standard production MiG-15bis was taken off the production line and specially converted for the high speed trials. This aircraft received the MiG-OKB project code of "SE" and the public designation MiG-15LL (*Letajushtshaja Laboratorija* — Flying Laboratory). It differed from the standard MiG-15bis in having an enlarged tail section. For the trials the armament was retained.

During the first test flight, held on 21 September 1949, test pilot Anatolij M. Tyuterev achieved a speed of Mach 0.97 during a shallow angle dive from 12,000 meters (39,370 feet). Three days later, he achieved Mach 0.985. It became clear that the aircraft would not be able to reach Mach 1 due to its tendency to roll to the left, which could only be avoided by using all the physical strength the pilot had. The MiG-15LL was returned for further modification and the tail section was enlarged further and a BU-1U hydraulic boost rudder system was installed. After nearly a month of modification work, the aircraft was again ready for a test flight.

On 18 October 1949, Anatolij M. Tyuterev dived from 12,200 meters (40,000 feet) and achieved Mach 1.01 (this was only the second time that a Soviet aircraft had flown faster than the speed of the sound). The trials with the MiG-15LL provided the MiG-OKB with valuable research data and, as a result of the experience gained with the BU-1U hydraulic boost system, it was introduced into the MiG-15bis production line (beginning in 1950). There was only one MiG-15LL built and it served as a test bed for various programs until it was finally destroyed in a crash.

During 1949, the MiG-OKB began work on a successor to the MiG-15 with the aim of correcting all the shortcomings of the Fagot but without changing its high rate of climb, rapid acceleration, short turning radius and short takeoff and landing characteristics. The MiG-OKB's internal designation for the new fighter type was Project SI and the Soviet military assigned the designation I-330 (I for *Istrebitel* - Fighter) to the new type.

The prototypes were conversions of MiG-15 airframes that had been retained at the Experimental Bureau for testing. The first prototype was fitted with an entirely new wing and designated the SI-1. It was followed a short time later by the second prototype, the SI-2. Basically, the prototypes were MiG-15bis airframes fitted with a redesigned wing, an increased fuselage length and an enlarged vertical fin. Both prototypes were completed during December of 1949, with the SI-1 being retained as a static test platforms, while the SI-2 was used for the flight tests. The SI-1 was also taken to the full scale wind tunnel at the Central Aero-Hydrodynamics Institute (TsAGI) for investigation of the airflow over the new wing.

One of the main differences between the MiG-15 and the Project SI prototypes was the new wing. The wing had a inboard leading edge sweep of 49 degrees and an outboard

The SI-2 was the MiG-17 prototype used for the flight tests and flew for the first time on 1 February 1950 with Ivan Ivashchenko at the controls. The aircraft was a modified MiG-15bis airframe with a new wing and vertical fin. The aircraft crashed on 20 March 1950, killing the pilot, Ivan Ivashchenko.

sweep of 45.5 degrees. The entire wing was much thinner than the MiG-15 wing and had more rounded wing tips. In order to avoid loss of airflow over the wing at low speeds, the wing was equipped with three wing fences instead of the two used on the MiG-15 wing. This new wing gave the SI prototype improved transonic behavior and better compressibility characteristics. The two different leading edge sweep angles resulted in a bend in the middle of the wing leading edge which led to its nickname of "Sickle" wing.

The fuselage was lengthened by 1.126 meter (3.98 feet) improving the prototypes lateral stability, while the increased tail surfaces improved directional stability and control. Another improvement was the installation of more effective wheel brakes on the main wheels, while the nosewheel had no brakes. The main wheel covers were also slightly modified in shape and the inboard main wheel doors were reduced in area and reshaped. On the MiG-15, the doors were squared off, while on the SI prototypes the doors had a triangular shape.

The SI-2 prototype carried a radio antenna fairing on top of the fuselage and an armament of two NS-23 cannons and a single NS-37 cannon. On 1 February 1950, the SI-2 made its maiden flight from Zhukovsky with MiG test pilot Ivan Timofeyevich Ivashchenko at the controls. During the flight testing conducted over the following weeks, the SI-2 achieved a speed in level flight of 692 mph at 7,058 feet and a speed of 716 mph during a shallow dive. During the trials, the prototype reached an altitude of 16,600 meters (54,446 feet) and consistently revealed far better handling qualities at high mach numbers than the MiG-15.

The project suffered a serious setback when the SI-2 prototype crashed on 20 March 1950. Ivan T. Ivashchenko had been briefed to dive from 16,042 feet and for some unknown reason he failed to recover from the dive. The SI-2 hit the ground at full speed, killing the pilot and totally destroying the prototype. During later tests with the SI-02 (the third prototype), G. Sedov discovered that the aircraft suffered from aileron flutter caused by a phenomenon known as aerolastic divergence. This was caused by a lack of wing rigidity which caused the ailerons to impart a rolling control movement, exactly opposite of what the pilot intended.

The SI-02, Red 671, was the third prototype, while the SI-01 was actually the fourth prototype delivered at Zhukovsky (due to production problems). Both were converted MiG-15bis airframes which differed in minor details from the earlier SI-2. Instead of a radio antenna fairing on the upper fuselage, these prototypes carried an SRU-O IFF blade antenna. The SI-02 also had the radio antenna wire deleted. The SI-02 had an early MiG-15 style nosewheel and was armed with a pair of NS-23 cannons and a single NS-37 cannon.

The SI-01 was similar to the SI-02 but had a trim tab fitted to the rudder and provision for two 400 liter (105.6 gallon) slipper tanks. Both prototypes were equipped with the RSIU-3 "Klen" radio, SRU-O IFF system, OSP-48 ILS system, ARK-5 radio compass and a MRP-48 marker beacon receiver. The SI-02 was powered by the same engine as the MiG-15bis, the 5,952 lbst VK-1 turbojet (without afterburner).

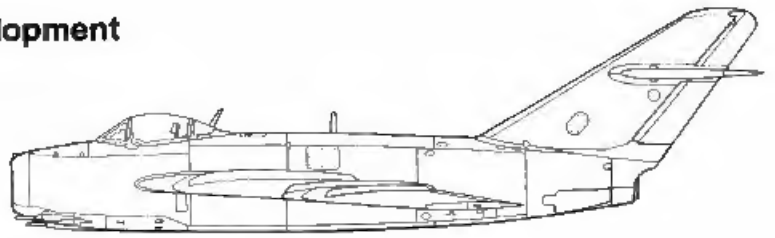
The State Acceptance Test Program was conducted by G. Sedov, S. Anochin, K. Kokkinaki and P. Kazmin. During these trials, speeds of 1,152 kmph (715.8 mph/Mach 1.03) were achieved. The test program was successfully completed on 20 June 1951 and in August of that same year, the aircraft was ordered into mass production under the designation MiG-17.

The test results clearly showed the advantages of the MiG-17 as compared with the MiG-15bis: it was 25 mph to 31 mph faster with better flying characteristics at high mach numbers and it had an improved rate of climb. The only shortcomings were more demanding handling characteristics during takeoff and landing because of the new, more sharply swept wing and an increased takeoff weight (some 600 pounds more than the MiG-15bis).

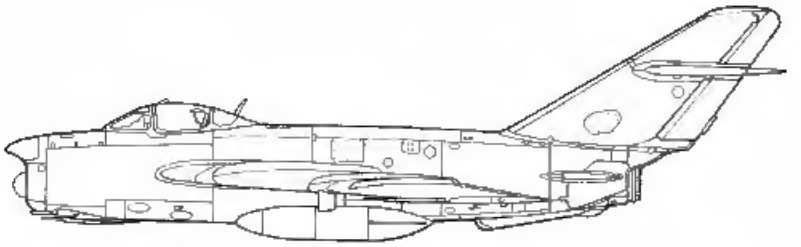
The SI-2, military designation I-330, had a new wing that used three wing fences and had different sweep angles. The inboard sweep was 49 degrees and the outboard sweet was 45.5 degrees. This difference led to the nickname "Sickle" wing.

The third prototype, SI-02, Red 671, on the ramp at Zhukovsky during its trials with the LII. As with all of the MiG-17 prototypes, the SI-02 was a rebuilt MiG-15 airframe. The SI-02, however, was equipped with redesigned main wheel doors.

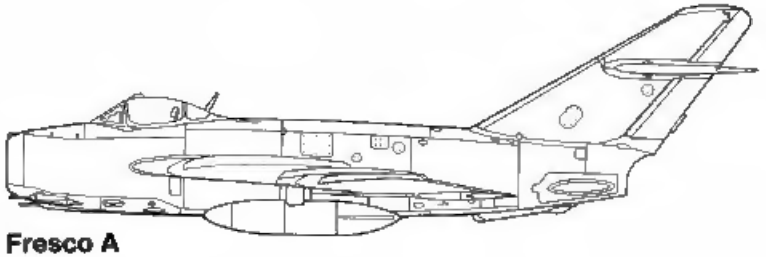
Development



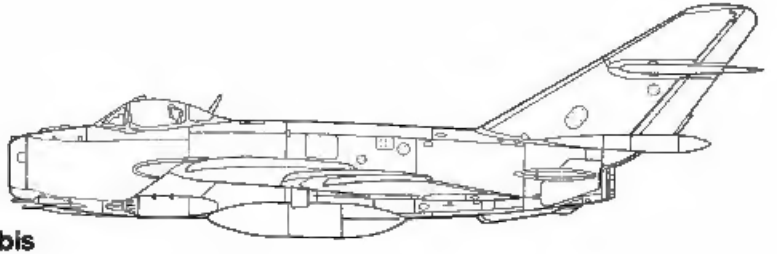
SI-02



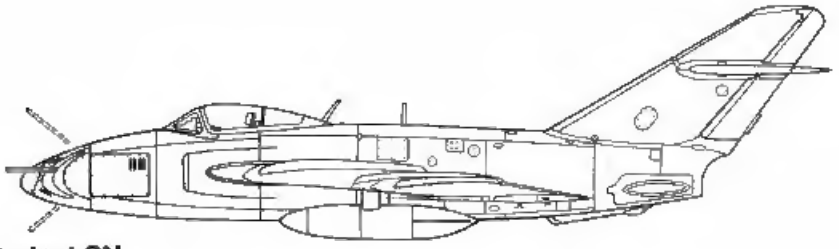
MiG-17PF Fresco D



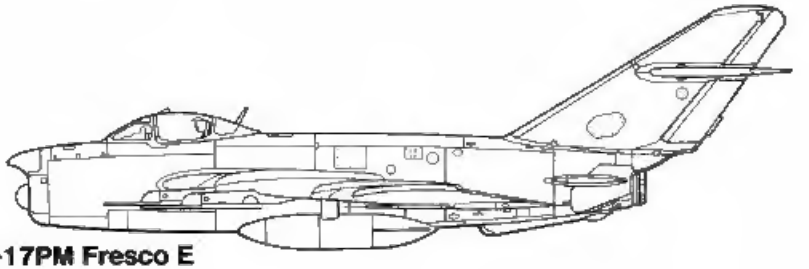
MiG-17 Fresco A



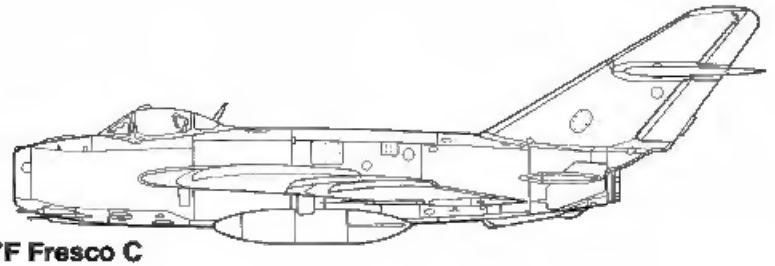
Lim-6bis



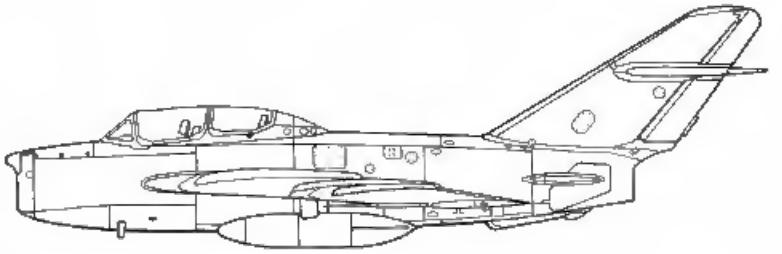
Project SN



MiG-17PM Fresco E



MiG-17F Fresco C



JJ-5

MiG-17 Fresco A

The first production batch of MiG-17s began leaving the factory during August of 1951, and were assigned to combat units for operational testing during October of that same year.

Early production MiG-17s were used primarily as air superiority day fighters and escort fighters. Compared to the MiG-15, there was very little change in the aircraft's overall handling characteristics except for the greatly improved flight characteristics at high mach numbers and the slightly more demanding takeoff and landing characteristics (because of the modified wing). It was not uncommon for experienced pilots to complete transition training from the MiG-15 to the MiG-17 in only five weeks.

The production MiG-17 differed from the prototypes in a number of ways. It should be remembered that the SI prototypes were in fact converted MiG-15bis airframes with the new wings and vertical fin. As such, they all retained a number of features from the MiG-15.

While the SI-2 and SI-01 had large fairings on the NS-23 cannon with unfaired shell ejection ports, the MiG-17 had the short NR-23 cannon fairings and faired shell ejection ports. Both prototypes used the early style MiG-15 nosewheel, while the production MiG-17 used the later style MiG-15bis nosewheel. The SI-2 and SI-01 had a single pitot tube on the starboard wing near the last wing fence, while the MiG-17 had two pitot tubes, one on each wing near the wing tip. The air brake on the production MiG-17 was enlarged and repositioned lower on the rear fuselage and equipped with a fairing over the hydraulic actuator.

The internal fuel capacity of the MiG-17 was 379 gallons carried in a rubberized main fuel tank mounted above and below the wing center section and in a second aluminum fuel tank containing 35 gallons mounted under the engine exhaust pipe. In addition, 88 gallon under-wing fuel tanks could be also carried.

During 1946, the Klimov-OKB began the first studies aimed at improving the performance and reliability of the Rolls Royce Nene power plant. This program resulted in the VK-1 power plant (the designation VK was given in honor of the chief designer Vladimir Klimov). The engine was essentially an improved Nene that could handle 30% greater airflow, which substantially increased the engine's available thrust. Other changes included enlarged combustion chambers, turbine blades and jet pipe. The Klimov-OKB succeeded making these improvements without enlarging the overall diameter of the engine. The MiG-17 was powered by a slightly improved variant of the VK-1, the 5,952 lbst VK-1A.

The MiG-17 was unveiled to the public on 20 June 1953 during the Air Parade at Tushino Air Force Base, which was attended by a number of Western military attaches. Initially it was speculated that the designation of the new type was the MiG-15-3 since no details of the type's designation had been released by the Soviets and many Western observers believed that it was a new variant of the MiG-15.

Before NATO was established, the USAF had established a system of identification numbers for new Soviet aircraft. This system allocated each new type a number in straight numerical sequence (the system did not distinguish the different categories of aircraft). The type number catalogue system was used for the first time at the Tushino Air Parade on 18 August 1946. At this show, Western observers spotted two new jet fighter aircraft: the Yak-15 which became "Type 1" and the MiG-9 which became the "Type 2." Under this system, the MiG-15 was known as the "Type 14" and the MiG-15bis was the "Type 19." When it was first identified, the MiG-17 received the designation "Type 38."

When NATO was formed during 1955, a new system came into being that used names instead of "Type" numbers. The Air Standards Coordinating Committee (ASCC) assigned names to each new aircraft according to the aircraft's mission, with all fighter types receiving names beginning with F. Under this system the early production MiG-17 received the ASCC Reporting Name, Fresco A. In mid-1955, the USAF began to drop the Type number system in favor of the NATO Reporting Name system.

The armament of the MiG-17 Fresco A was the same as used on the late MiG-15bis. A single N-37 37MM cannon was carried on the starboard side of the retractable weapons platform, with two NR-23 23MM cannons placed on the port side. Maintenance and rearming of the MiG-17 was simple and easy to accomplish. The cannon barrel covers were removed and the retractable weapons platform was lowered on its wire supports (with the help of a hand held winch). In the lowered position the ammunition boxes could be easily reloaded and the guns themselves could easily be removed, serviced or inspected.

The combination of two 23MM cannon and a single 37MM weapon gave the MiG-17 formidable firepower against ground targets and for bomber interception, but the low rate of fire of these large caliber weapons was a disadvantage in air-to-air fighter combat. The large caliber weapons used by the Soviet Union during this period had been developed by the Russians after the Great Patriotic War (WW II) and were based on German designs, in particular those of the Rheinmetall company.

The NR-23 cannon had been developed from the NS-23, which was carried on the MiG-15bis. It was mass produced from 1949 onward and featured an improved ammunition feed system and improved rate of fire (850 rpm instead of 550 rpm for the NS-23). The N-37 cannon weighed 103 kg (227 pounds) and had a rate of fire of 400 rpm. The ammunition supply for the N-37 was forty rounds while the NR-23s had eighty rounds per gun stored in ammunition boxes between the gun barrels.

The MiG-17 could carry under-wing weapons on a D4-50 bomb rack which was mounted in place of the usual under-wing fuel tanks. This rack could carry various types of bombs including 100, 220 and 551 pound weapons. The under-wing pylon could also

This early production MiG-17 Fresco A, Red 01, had the tactical number outlined in Black. The first production batches of MiG-17 Fresco As were delivered in August of 1951 and were assigned to Air Force units for tactical evaluation. The early Fresco A lacked the rear view mirror on the upper canopy framing of its MiG-15 style canopy.

carry two 212MM ARS-212 or four 190MM TRS-190 unguided rockets. The TRS-190 weighed 46 kg (101 pounds) with a 10 kg (22 pound) warhead, while the ARS-212 weighed 116 kg (226 pounds) with a blast radius of 22 meters (72 feet). The TRS-190 and ARS-212 could be fired singally or in salvos.

Additionally, the MiG-17 could carry the ORO-57K seven shot rocket pod armed with S-5 57MM unguided rockets. There were two different types of S-5S: the S-5M for air-to-air engagements and the S-5K for air-to-ground attacks. Carrying either the TRS-190, ARS-212 or ORO-57K pod reduced the top speed of the MiG-17 by 20 kmh (12.4 mph) and the service ceiling by 650 m (2,123 feet).

Avionics installed in the MiG-17 included an ARK-5 "Amur" radio compass, an RV-2 "Kristal" radio altimeter ("T" shaped antennas carried under the port wingtip and starboard inboard wing panel), an MRP-48P "Khrizantema marker beacon receiver, a DGMK-3IIS direction finder, and an R-800 radio (the transmitter and receiver were carried in the nose compartment in front of the cockpit).

The MiG-17 used the same ejection seat as the MiG-15 and MiG-15bis. This seat was a rather primitive design that assured a safe ejection only at speeds over 700 km/hour (435 mph) and at altitudes above 750 feet (below 750 feet the parachute would not fully deploy). This type of seat had several shortcomings, it was difficult to eject from the aircraft since the MiG had to be in horizontal flight, there was no protection for the pilot's face and he had to separate himself from the seat after 1.5 to 2 seconds and manually open his parachute, there was no automatic seat release and there was no chance for survival if the pilot lost consciousness since there was no system for automatically opening the parachute.

While the MiG-17 prototypes (except SI-01) had no trim tab on the rudder, the production MiG-17 Fresco A had a small trim tab added to the rudder. To improve directional stability, the MiG-17 had a ventral fin installed under the rear fuselage. This fin also incorporated a tail bumper in the rear portion of the fin.

The MiG-17 wing was thinner than the MiG-15 wing and, while the MiG-15bis had two wing fences with a cutout in the inboard port wing fence, the MiG-17 had three wing fences with no cutouts. The three wing fences were installed to prevent span-wise air flow at high angles of attack. The wing structural elements were similar to the MiG-15 but the leading edge had a bend at mid-span. The inboard sweep angle was 49 degrees while the outboard angle was 45.5 degrees. The aluminum ailerons were power boosted by a BU-1U hydraulic boost system and were fitted with trim controls. The wing was also fitted with Fowler type trailing edge flaps that extended 20 degrees for takeoff and 60 degrees for landing.

While the early production Fresco As lacked radar warning antennas, later Fresco As had two antennas on each wing. These small button antennas were located beside the outboard wing fence and behind the wingtip position light. Additionally, the MiG-17 had a small rectangular balance weight installed under each wingtip.

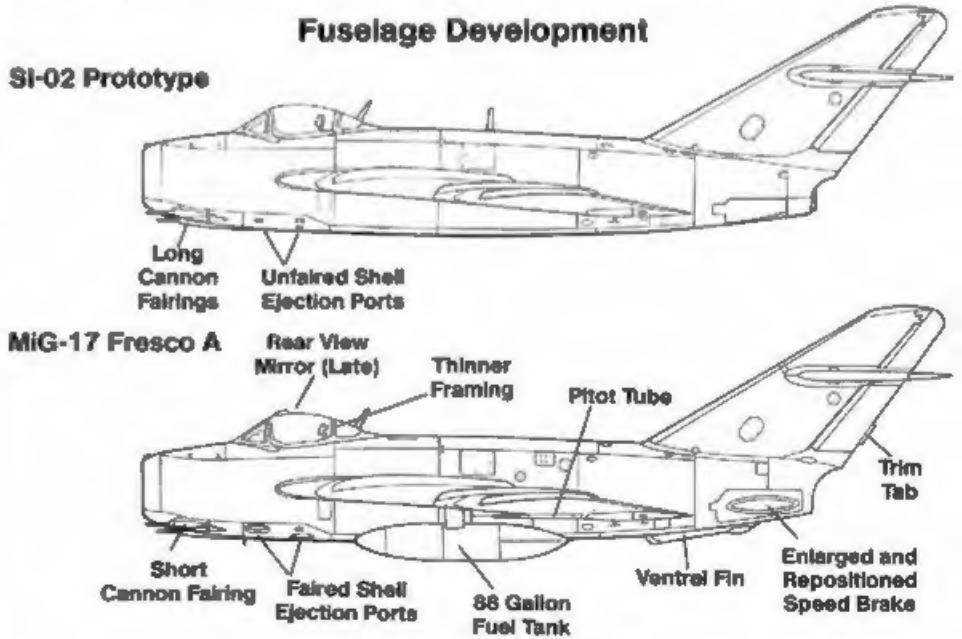
One complaint voiced by pilots involved in the operational testing of the MiG-17 concerned the rather ineffective main wheel brakes. As a result, the main landing gear was fitted with improved pneumatic brakes which became standard on production MiG-17s.

Early MiG-17As were not fitted with the Syrena 2 tail warning radar, which was added to the aircraft shortly after the first production batches left the assembly line. The Syrena 2 tail warning radar system was installed in a fairing just below the tail position light.

The first MiG-17 Fresco As off the production line were equipped with the same canopy as the MiG-15bis. A short time later, a new canopy was introduced into the production line that was similar to the MiG-15bis canopy but had a smaller rear canopy frame and a rear view mirror installed in the upper canopy framing. Most MiG-17 Fresco As were equipped with a liquid deicing system. This system used alcohol sprayed onto the windscreen from a small tube mounted in front of the windscreen.

There were a number of early MiG-17s fitted with the SRU-0 IFF blade antenna on the fuselage spine, although most Fresco As did not carry this antenna. A few early MiG-17s also used a radio antenna system similar to the MiG-15 where the antenna wire ran from the tail to a small post just below the large swept back antenna mast; however, this system was quickly deleted and most Fresco As carried no antenna wire.

This MiG-17 Fresco A, Red 16, has an IFF antenna on the fuselage spine. The Fresco has a Black outlined tactical number and weathered national insignia on the vertical fin. Additionally, the aircraft has a Red rudder and national insignia on the wing uppersurface, both highly unusual for a service fighter.



Later, some MiG-17 Fresco As were modified with under-wing rocket/missile rails. These rails could carry either large air-to-ground rockets or K-13A (AA-2) Atoll air-to-air infrared guided missiles. An improved variant of the MiG-17 Fresco A with a VK-1A power plant and improved avionics and cockpit equipment was produced under the designation MiG-17SA. Externally it was identical to the Fresco A so it received no new NATO name.

There were only three WARSAW Pact countries that operated the MiG-17 Fresco A. Bulgaria was the first country to be equipped with the Fresco A receiving their first aircraft during 1953. These aircraft served with the 10th Fighter Division and late in their operational service lives were camouflaged for use in the fighter-bomber role.

In late 1955, Poland received a small number of Fresco As. In 1957 the German Democratic Republic also received a few Fresco As, which were generally referred to as the MiG-17-*glatt* (*glatt* — blank). This name came about from the fact that the aircraft lacked a sub-designation letter. Most of the Fresco As were assigned to the School Regiment of the Officers School. They were also used as trainers with the fighter regiments of the East German Air Force.

When later variants of the MiG-17 became available, a number of MiG-17 Fresco As were exported. During 1957, the first MiG-17 Fresco As were delivered to Afghanistan; these aircraft were later supplemented by a number of MiG-17Fs. Most of the MiG-17 force was based at Mazar-i-Sharif Air Force Base and when the Soviet Union came in to help the Afghan government, Afghan Air Force MiG-17 Fresco As were used to fly ground attack sorties against the Mujahideen. These sorties were carried out using cannon fire, unguided rockets and bombs.

MiG-17 Fresco As were also delivered to the air forces of China, Cuba, Morocco, Mongolia, Mozambique and Sri-Lanka (Ceylon).

During the Soviet/WARSAW Pact invasion of Czechoslovakia in 1968, a number of Soviet Air Force Fresco As were deployed to provisional airfields inside Czechoslovakia. The first of these aircraft were deployed during August and all the aircraft which took part in the invasion were marked with two large Red stripes around the rear fuselage to allow for rapid identification of friendly aircraft.

The Fresco A (MiG-17, MiG-17A and MiG-17SA) was considered to an interim aircraft by the Soviet Air Force. Work was progressing on a new variant of the VK-1 engine with an afterburner. After this engine, designated the VK-1F, passed state acceptance trials and was cleared for mass production, work began on a new variant of the MiG-17 designed to use this engine. Production of the Fresco A lasted from August of 1951 until the Spring of 1953 when the production was phased out in favor of this new afterburner equipped variant.

As the Fresco A was replaced by more advanced variants, many were passed to training regiments while others were retained for conversion training within combat units and remained in service for a very long period.

The Fresco A was used as the mount for the Soviet Air Force Acrobatic Team. The aircraft had the fin and uppersurfaces of the fuselage and wings painted in Red with the undersurfaces left in Natural Metal.

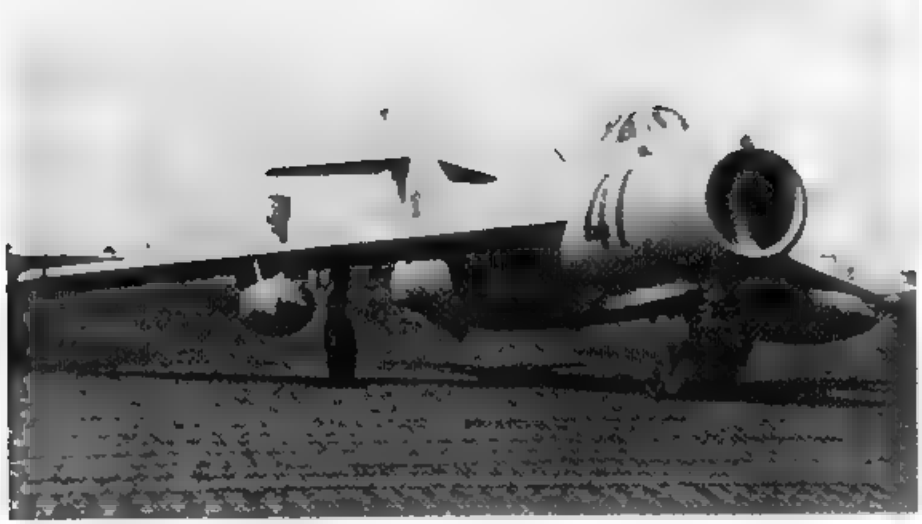
The MiG-17 Fresco A used the same ejection seat as the earlier MiG-15 Fagot. This early type of seat had several shortcomings: no automatic seat separation or parachute opening. The aircraft have several different styles of Blue tactical numbers: some have solid Black outlines while others have a broken Black outline.

The third aircraft in this line of MiG-17As appears to be painted in an overall Dark Gray color. The tactical number is Yellow with a thin Black outline. These are mid-production aircraft without the IFF antenna on the fuselage spine which were carried by early production Fresco As.

A pair of Soviet Air Force MiG-17 Fresco As share the ramp with a pair of MiG-15UTI Midget trainers while being refueled. The MiG-17s are equipped with a Syrena 2 tail warning radar under the tail position light and have the national insignia carried on the wing upper-surface.

A MiG-17A, Blue 68, on final approach to a forward airstrip during the WARSAW Pact invasion of Czechoslovakia in August of 1968. During the invasion, Soviet Air Force aircraft carried two Red identification stripes around the rear fuselage.

This MiG-17A of the Soviet Navy was modified with an underwing pylon outboard of the normal fuel tank/bomb rack location. This pylon was wired to carry launch rails for the AA-2 Atoll air-to-air missile. A number of these aircraft were also exported to Cuba.

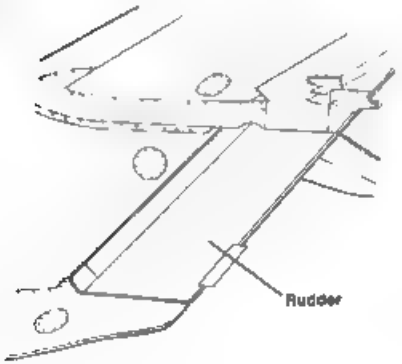


This MIG-17 Fresco A, Red 41 carries a non-standard overall Medium Gray camouflage. Most Soviet Air Force Fresco As were used operationally in a Natural Metal finish. The nose of the 800 liter (158 gallon) drop tank was in Red.

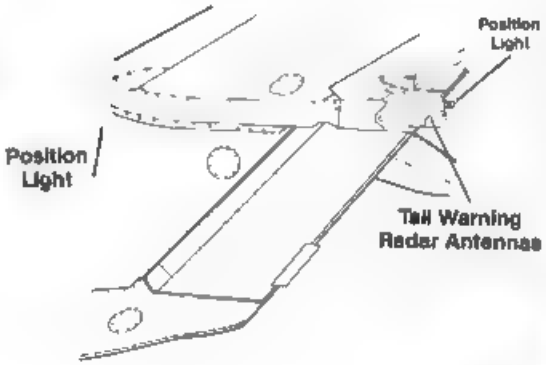
A pair of overall Medium Gray MiG-17 Fresco As. The Fresco A in the foreground, Red 41, has a Red rudder and the drop tank nose is also in Red. This is an early production MIG-17 with a MIG-15 style canopy without the rear view mirror.

Syrena 2 Tail Warning Radar

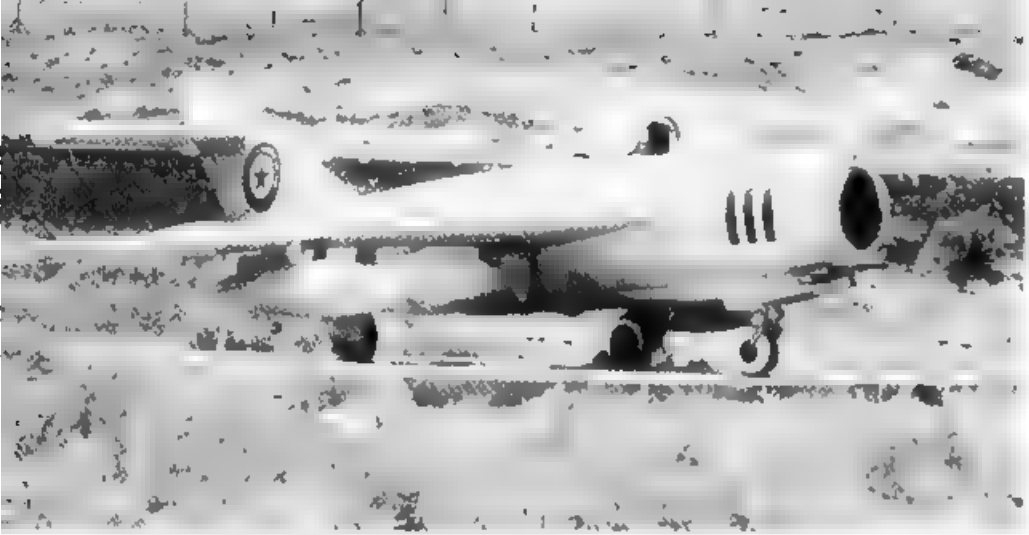
MiG-17 Fresco A (Early)



MiG-17 Fresco A (Late)



The pilot of this early MIG-17 Fresco A, Red 29, is in the cockpit performing his preflight checks prior to taxing out. The tactical number had a small Black outline and was repeated in Red on the underwing drop tank. This particular MIG-17 was not equipped with the SRU-O IFF antenna on the fuselage spine.



This MiG-17A, Blue 111, of the Afghan Air Force has had the tires painted in White to protect the rubber from the effects of the sun. The Afghan Air Force received its first MiG-17s in 1957, basing them at Mazar-i-Sarif Air Force Base. Afghan MiG-17s saw combat in the ground attack role during the Afghan civil war.

The *Luftstreitkraefte* received a small number of MiG-17A Fresco As.This aircraft, Red 589, over ran the landing strip and engaged the TFF/64-66 crash barrier developed by the VEB Flugzeugwerke Dresden in East German. The barrier was similar to the crash barriers used on aircraft carriers.

A Mongolian Air Force pilot boards his MiG-17 Fresco A, Red 003, before starting another mission. This aircraft lacks the Syrena 2 tail warning radar system, but was modified with a radio antenna wire leading from the tail fin to the radio mast below the cockpit, similar to the radio antennas on the MiG-15.

This MiG-17 Fresco A, CF 903, of the Sri Lanka Air Force at Katunayake Air Base during 1981, was one of a number of MiG-17s and MiG-15UTIs delivered to Sri Lanka. This Fresco A lacks the canopy mounted rear view mirror and had as an antenna wire from the tail to the post just in front of the antenna mast. The markings on the nose and drop tank were in Red. (Peter Steinemann)

Experimental Projects

Project SI-10

In late 1954 the MiG-OKB began work on an experimental aircraft designed to improve the handling characteristics and especially the maneuverability of the MiG-17 Fresco A. This project was based on the test results obtained during the flight testing of the SI prototypes.

A MiG-15bis, Red 214, was converted to MiG-17 standard and served as the prototype. In contrast to the standard MiG-17 wing with its three wing air flow fences, the new wing featured a two piece leading edge slat. These slats worked automatically during the flight and were also used to improve airflow over the wing during takeoff and landing. The prototype received the company designation SI-10 and was the first MiG fighter to feature automatic leading edge slats.

Factory testing of the SI-10 began in early 1955 at Zhukovsky by MiG-OKB test pilots G. Mossolov, G. Sedov and A. Tshernoburov. In June of that same year, the SI-10 prototype was passed to the Flight Research Institute (LII) for state acceptance trials. Various LII pilots conducted a total of forty-seven flights with a total flight time of thirty-two hours. These tests revealed that the leading edge slats greatly improved the Fresco's maneuverability, in particular at high altitudes and high speeds. Compared with the MiG-17 Fresco A, the takeoff run was reduced from 1,260 meters (4,133 feet) to 1,070 meters (3,510 feet).

For its time, the slat system was unique for fighter aircraft. It clearly showed an advantage in improved flight characteristics, but its disadvantage was that the system with the slats, motor and other equipment weighed some 120 kg (264.5 pounds) which was considered too heavy for the advantages it offered. As a result the SI-10 prototype remained a one of a kind technology demonstrator.

Project SR-2

In 1952, to meet a Soviet Air Force requirement, the MiG OKB developed a high altitude reconnaissance version of the MiG-17A under the company designation SR-2. The SR-2 was powered by the 8,500 lbst VK-5F centrifugal flow afterburning turbojet. With this power plant the SR-2 had a cruising altitude of 53,900 feet making it a difficult target for Western interceptors of the time.

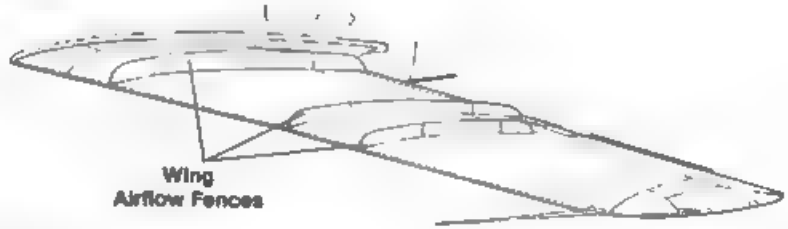
The SR-2 was armed with two NR-23 23MM cannons with 100 rounds for each gun. The cannon fairing was enlarged covered the shell ejection port eliminating the separate shell ejection port fairing. There was a bulged fairing under the fuselage which covered the camera bay which housed an AFA BA 40R camera. In addition to the camera, a MAG-9 night illumination pod was installed which dispensed photo flash bombs. The lens of the camera was covered during takeoff and landing by a sliding cover which protected the camera window from dirt, stones and other objects.

The SR-2 had flush air brakes fitted and the ventral fin was reduced in size with the tail bumper being repositioned to the middle of the fin. The SR-2 had an SRO-O IFF blade aerial fitted on the fuselage spine and was equipped with a standard MiG-17 ejection seat.

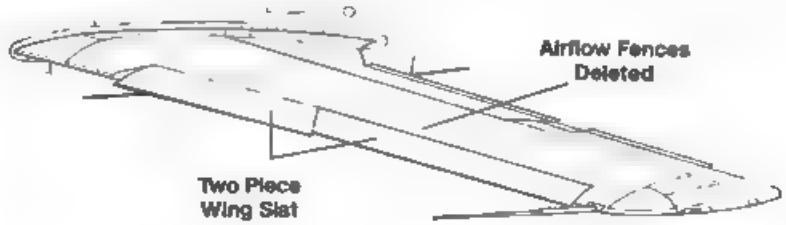
The SI-10 was an experimental version of the MIG-17 with a slated wing. The wing carried a two piece leading edge slat that replaced the three wing air flow fences on the standard MIG-17. The SI-10, Red 214, like the MIG-17 prototypes was rebuilt to MiG-17 standards from a MiG-15bis airframe.

Slatted Wing

MiG-17 Fresco A



Project SI-10



The SR-2 left the factory during May of 1952 and flew for the first time from Zhukovsky with MiG-OKB test pilot A Tshernoburov at the controls during June The factory tests lasted from June of 1952 until January of 1954 During this same time period the State Acceptance trials were held in parallel and involved LII test pilots S Mikoyan and P Belyasnik. The State acceptance trials lasted until 10 August 1954 While the SR-2 met the Air Force specification, the use of the VK-5I power plant was felt to be impractical since all other late production MiG-17s were equipped with the VK-1F power plant. As a result, the project was abandoned and the SR-2 prototype remained a one of a kind prototype.

MiG-17SN (Project SN)

One of the most interesting experimental trials ever carried out by the MiG-OKB was known as Project SN The entire project was based on the theory that the use of flexible cannons on a single seat fighter was an effective way to quickly bring your weapons to bear on enemy aircraft. It was felt that the advantage of the flexible guns was that only the gun, not the entire aircraft had to be aimed at the target.

The project involved the MiG-OKB and the cannon's manufacturer, Afanasseyev and Makarov They were responsible for the articulated cannon system which was to be installed in the fighter The Project SN prototype was a standard MiG-17 Fresco A with a completely redesigned nose section that was 1.069 meters longer (3.5 feet). To mount the gun turret, the nose air intake was deleted and the aircraft was fitted with bifurcated fuselage side mounted air intakes.

The SV-25-MiG-17 armament system installed in the MiG-17SN consisted of three TBK-495 23MM cannons installed in the nose, two on the port side and one on the starboard side The guns were able to rotate vertically through an arc of 27 degrees 26 and -9 degrees 48' The guns were electrically aimed, had a rate of fire of 250 rounds per minute and the entire system weighed some 469 kg (1,033 pounds).

The factory tests began during 1953, under test pilot G Mossolov. The State test trials, conducted by the Flight Research Institute, started on 15 February 1954. The SV-25-MiG-17 armament system was also installed on an Il-28 Beagle bomber to train pilots in the use of the turret. There were only three test flights made with the MiG-17SN involving air-to-air firings, while another thirteen flights were executed against ground targets.

The tests with the MiG-17SN once again showed that theory and practice could differ sharply from each other The flight tests revealed that there was great difficulty in accurately aiming articulated weapons from high speed aircraft. One of the aiming problems was that angles of 17- .0 degrees required a special gunsight The trials also revealed that the MiG-17SN was about 60 kmh (37 mph) slower than a standard Fresco A.

Due to the serious aiming difficulties and the inferior performance of the prototype, the project was abandoned

I-340 (Project SM-1)

During the late 1940s and early 1950s the MiG-OKB worked on several designs aimed at producing a supersonic fighter which could be mass produced. The MiG-15Ll and some MiG-17s were capable Mach 1 but for only brief periods in a dive During the mid-1950s the bureau begun to develop a twin engined supersonic experimental aircraft based of the MiG-17 under the designation I-340 The I-340 (also known as the SM-1) was the beginning of an experimental program that later evolved into the MiG-19 Farmer

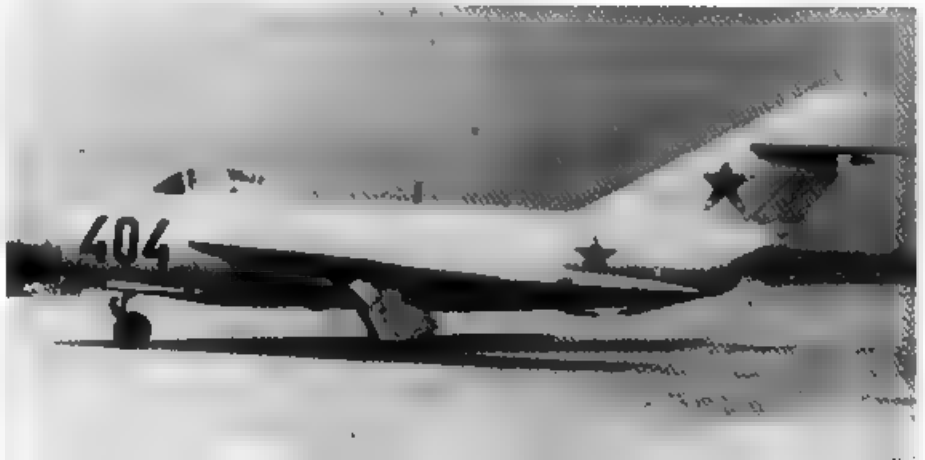
The I-340 was fitted with two 6,702 lbst AM-5F power plants developed by Alexander Mikulin The advantages of these engines were their small diameter and their excellent fuel consumption. The power plants were installed side by side in a redesigned rear fuselage which also housed two additional fuel tanks (220 and 330 liters respectively 58 and 87 gallons)

The factory tests began during late 1951 These trials were flown by MiG-OKB test pilot Grigory Sedov The data obtained from these trials helped prove that the side by side configuration of the engines was practical and laid the ground work for the MiG-19 family of twin engined fighters.

The I-340 was converted from a standard MiG-17 Fresco A. The air intake was modified with the intake splitter plate being changed The new plate was straight and even with the front of the intake The aircraft had two cooling air intakes installed on both sides of the fuselage along the fuselage spine The air brakes were enlarged and the tail bumper on the ventral fin was relocated to the middle of the fin The aircraft had no tail warning radar antenna but carried an SRU-0 IFF antenna on the fuselage spine.

Project SR-2 was intended to be a high altitude reconnaissance variant of the MIG-17 Fresco A. The prototype was tested at Zhukovsy during 1952. In place of the normal twin NR-23 cannons, the prototype carried a single NR-23 cannon on the port side of the nose housed in a long fairing and a blister under the fuselage to accommodate the camera system. It was powered by a VK-5F power plant and had a ceiling of 55,000 feet.

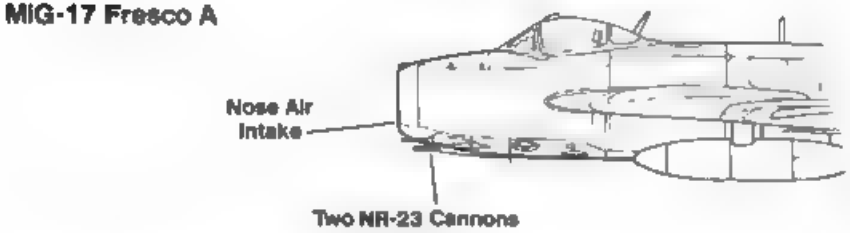
The SR-2 prototype differed from the standard MIG-17 Fresco A in a number of ways. The SR-2 had no rudder trim tab, it had a smaller ventral fin with the bumper in the middle of the fin, a single port side NR-23 cannon and a fairing under the fuselage below the cockpit for the camera system.

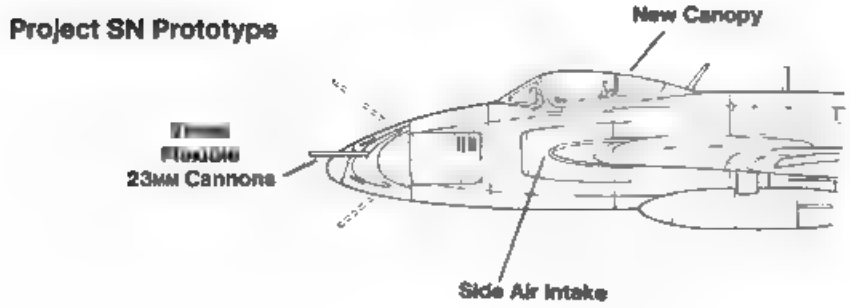


The Project SN prototype was a fighter-assault aircraft based on the MiG-17 Fresco A. The aircraft had a new nose section equipped with three (3) articulated TBK-495 23mm cannons and bifurcated side mounted air intakes. The guns could be rotated vertically +27 degrees (upper) and -9 degrees (lower). The gun slits were equipped with sliding seals that served to fair them in and reduce drag.

The SM-1 had two cooling air inlets on each side of the fuselage spine in front of the IFF antenna to bring in cooling air for the two AM-5F power plants designed by Alexander Mikulin. The SM-1 was basically a twin engined MiG-17 Fresco A. The air brakes were in the same location as on the Fresco A, but were larger.

Project SN Prototype





The twin engined SM-1 was tested at Zhukovsky during 1951. The diameter of the rear fuselage was enlarged to accommodate the two 6,702 lbst AM-5F power plants. The aircraft also carried no Syrena 2 tail warning radar antenna. Experience gained with this aircraft was highly useful during development of the MiG-19.

MiG-17F Fresco C

The MiG-17F (F for *Forsirovannyy* - boosted) was the most widely produced variant of the MiG-17. The main difference between the MiG-17F and the earlier MiG-17 Fresco A was the power plant. The MiG-17F used the 7,452 lbst VK-1F afterburning turbojet. The introduction of the afterburner gave the MiG-17F a substantial increase in available power for takeoff and combat, however, fuel consumption was drastically increased and, as a result, the MiG-17F was usually flown with two 400 liter (105.6 gallon) underwing drop tanks.

The VK-1F power plant was based on the VK-1A but was radically redesigned by Vladimir Y. Klimov and his staff in the Klimov-OKB in Leningrad and it became the first mass produced Soviet jet power plant with an afterburner. Compared with the VK-1A used in the MiG-15bis and MiG-17A, the thrust of the VK-1F was greatly improved, from 5,950 lbst to 7,452 lbst while the engine weight only increased a total of 263 pounds. Static tests of the new power plant were successfully completed during 1952 and later that same year the VK-1F was cleared for installation into a MiG-17 for flight testing. Airframe modification work to accommodate the new afterburning engine was done under the MiG-OKB project code SF.

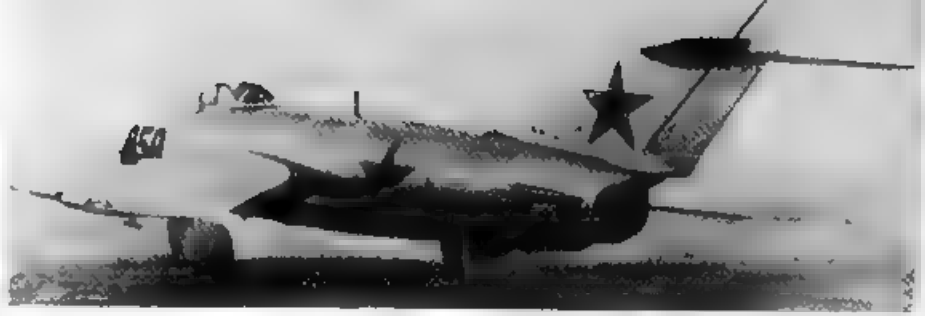
The SF prototype was a converted MiG-15bis. It had the early MiG-15bis type nosewheel, was armed with two NS-23 cannons and a single NS-37 cannon and used a standard MiG-15bis canopy. Compared with the standard Fresco A, the SF prototype featured a totally redesigned rear fuselage. The air brakes were enlarged and reshaped with the hydraulic jack fairing being repositioned higher on the air brake.

The factory test program began on 29 September 1951 and quickly revealed the prototype's improved performance, stability and handling at transonic speeds. On 16 February 1952, the SF prototype was handed over the Flight Research Institute (LII) for further testing. The LII tests revealed that the prototype had a greatly improved rate of climb. While the Fresco A required five minutes six seconds to reach 32,083 feet, the SF reached this same altitude in three minutes forty-two seconds. The service ceiling was also increased from 50,049 feet on the MiG-17 Fresco A to 53,258 feet; however, the top speed actually decreased slightly from 746 mph for the Fresco A to 715 mph for the SF prototype.

The tests proved very successful and were terminated during late 1952. The aircraft was ordered into production under the designation MiG-17F and when identified, NATO allocated the MiG-17F the ASSC reporting name Fresco C. In Czechoslovakia the aircraft was known under the designation S-104 (which was later changed to MiG-17 during the late 1950s). In Hungary the MiG-17 was called the *Czuszo* (Glider).

The MiG-17F Fresco C differed from the MiG-17 Fresco A in a number of ways. Externally, the most noticeable change was the redesigned tail section. On the Fresco A the jet pipe was not visible and there was no small access hatch at base of the rudder. Additionally, a number of access hatches around the fin and rear fuselage were relocated because of the new engine. The MiG-17F also had four small air inlets on the fuselage side and a small access hatch was added to the nose on the port side.

Another difference between the MiG-17 Fresco A and MiG-17F Fresco C was the location of the FKSR-46 flare dispenser. This signal flare launcher, which could fire up to four different color flares, was relocated from the starboard fuselage side on the Fresco A. On the Fresco C it was relocated to a position on the lower part of the fin. While early production Fresco As were not equipped with a Syrena 2 tail warning radar, all Fresco Cs carried the system on the fin below the position light.



The MiG-17 SF prototype had a redesigned rear fuselage for the afterburning engine with enlarged air brakes. It did not have a trim tab on the rudder or a Syrena 2 tail warning radar. The SF prototype was test flown by Pjotr Kasmin who achieved a speed of Mach 1.18 in a dive from 14,000 meters (46,000 feet).

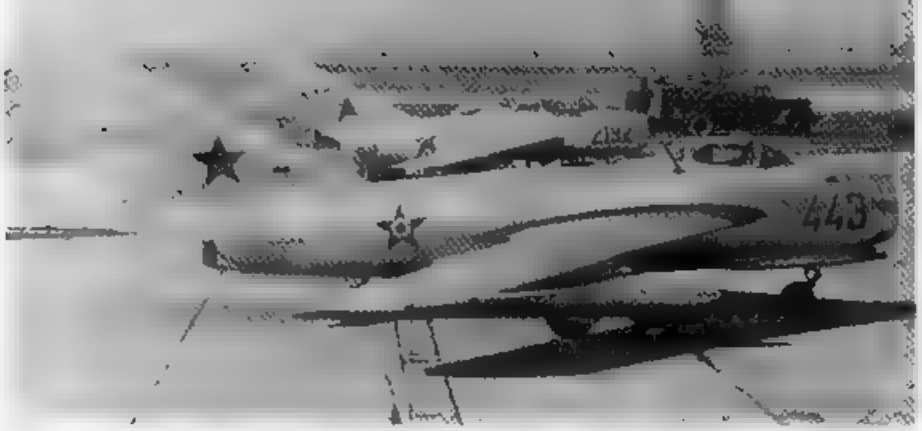
There were also some improvements made in the cockpit layout and equipment. While all Fresco As were equipped with a MiG-15 type ejection seat, the Fresco C was fitted with an improved ejection seat. This seat differed from the early seat in having a much larger headrest that was more box shaped than that of the Fresco A. The seat headrest included a face curtain that was pulled down in front of the pilot's face with both hands. This action fired the canopy and, when the curtain was fully deployed, actuated the seat charge.

Three seconds after ejection, the AD-3 seat belt cutter automatically separated the pilot from the seat. If the pilot failed to manually open his parachute, it was automatically opened between 15,000 and 12,000 feet. The new seat allowed safe ejections at speed up to 850 kmh (528 mph).

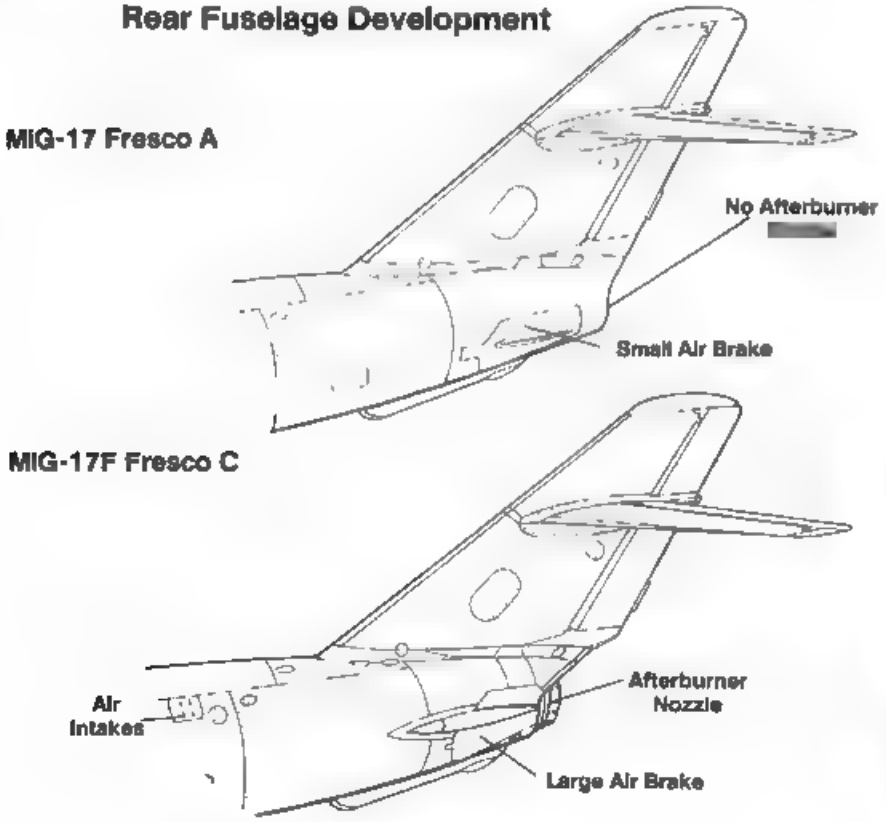
The VK-1F had a number of advantages over the earlier VK-1A in operational service. Thanks to the afterburner, the takeoff run was reduced from 590 meters (1,935 feet) to 350 meters (1,148 feet). There were, however, some limitations to afterburner use. One shortcoming was that the afterburner could only operate for three minutes at altitudes below 7,000 meters (22,965 feet) and for ten minutes at altitudes above 10,000 meters (32,808 feet). If these times were exceeded, there was a risk of fire in the engine. On later production batches, this problem was resolved.

One of the shortcomings of the MiG-17F was its increased fuel consumption in afterburner. Due to several internal changes, the fuel capacity of the MiG-17F was reduced from 379 gallons (Fresco A) to 374 gallon. As a result, the MiG-17 was usually flown with two 400 liter (105.6 gallon) underwing fuel tanks. The maximum economical endurance with external fuel tanks is two hours thirty-nine minutes at 12,000 meters (39,370 feet).

Flight tests with the SF prototype began on 29 September 1951. While undergoing State Acceptance Testing the aircraft carried the badge of the LII (Flight Research Institute) on the nose in Red and Soviet national insignia on the fuselage as well as the fin.



A Romanian Air Force MiG-17F, Red 443, shares the ramp with a MiG-15UTI Midget, Red 2192. The tactical number on both aircraft has a thin White outline and the national markings were not carried on the wing uppersurfaces. The Air Defense Regiments of the Romanian Air Force operated a small number of MiG-17Fs.



During its operational career, a number of changes were introduced to the MiG-17F. A few MiG-17Fs had a radio antenna wire leading from the tail to a small mast near the antenna mast on the starboard fuselage side, however most MiG-17Fs did not carry this antenna wire. Some MiG-17Fs were fitted with a small pitot tube on the starboard side of the nose just in front of the cockpit. Most MiG-17Fs did not carry the SRO-2 IFF blade antenna on the fuselage spine, but on some aircraft, the improved SRO-1 "Barn" warning system was installed and its blade antenna was mounted on the fuselage spine.

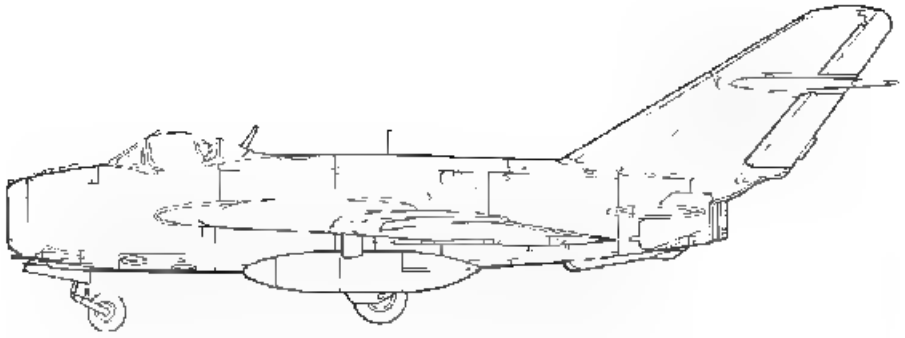
On some late production blocks, the N-37 cannon was replaced with the improved N-37D cannon, although externally this change could not be detected. During its production life a number of different gun sights were fitted to the MiG-17F: early versions were equipped with the ASP-3N and ASP-3NM gun sights, while late production variants used the ASP-3WM gunsight.

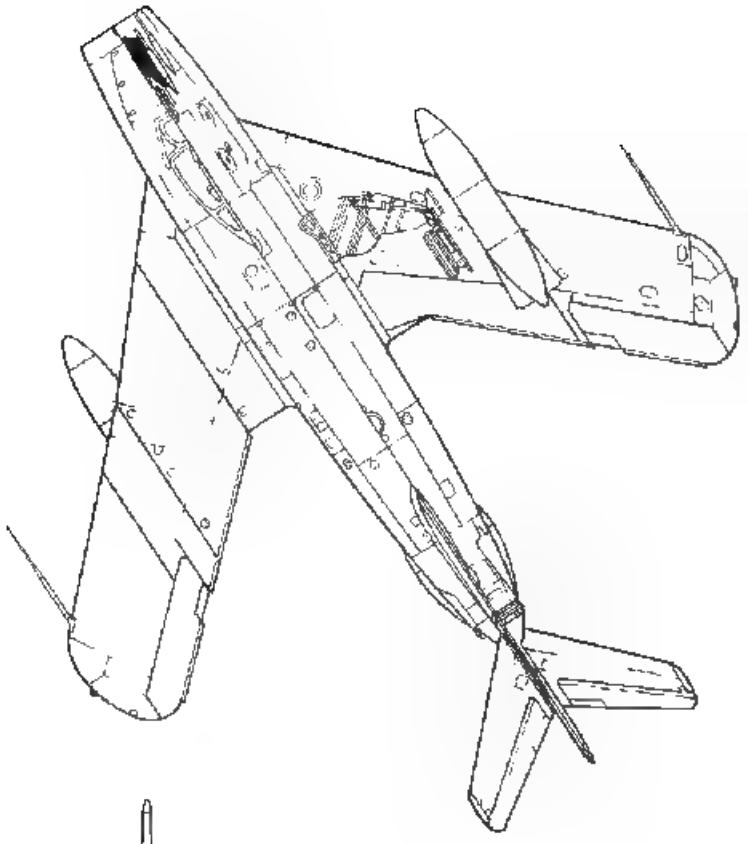
Late production MiG-17Fs were equipped with the SRD-1M range finder, a radar system which gave the pilot automatic and constant range information that was integrated into the fire control computer. This range finder was coupled with a more advanced ASP-4N gunsight. The SRD-1M could track targets at ranges between 962 feet and 3,850 feet, the equipment weighted fifty-five pounds and was installed in the nose compartment. The SRD-1M rangefinder antenna was a low Black bar shaped antenna mounted in the center of the nose just in front of the cockpit. A number of early MiG-17Fs were retrofitted with the SRD-1M range finder.

Some late production blocks were also equipped with two radar warning button antennas on each wing. One was mounted beside the outboard wing fence and one behind the position light on the wing tip. There were also a number of early Fresco C's and Fresco As retrofitted with this equipment.

The MiG-17F was built in various Soviet State Aircraft Factories with the last MiG-17F coming off the production line during 1958. At its peak, production reached some 300 per month, making it one of the most widely produced Soviet fighters with a total of approximately 8,000 aircraft being built.

The first public exhibit of the first MiG-17F to arrive in Czechoslovakia drew considerable public attention. The type was flown in Czechoslovakia under the designation S-104. The letter S stood for *Stihac* — Fighter. During the late 1950s the designation was again changed to MiG-17F.





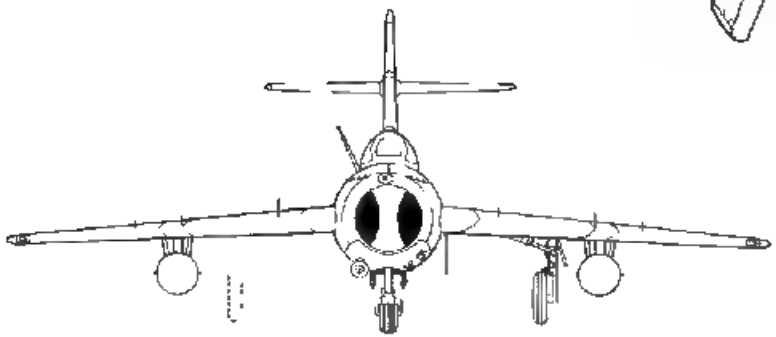
Specifications

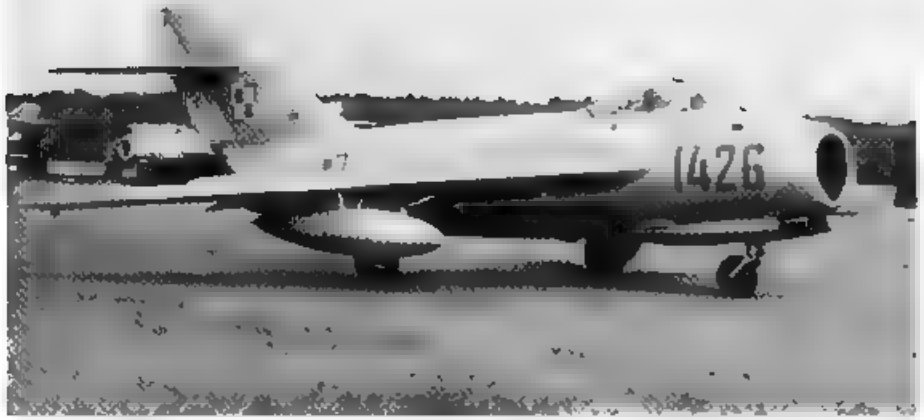
MiG-17F Fresco C

Wingspan ..... 30 feet 10 inches
Length ..... 36 feet 5 inches
Height ..... 12 feet 3 inches
Empty Weight ..... 8,664 pounds
Maximum Weight ..... 13,386 pounds
Powerplants ..... One 7,452 lbst VK 1F afterburing turbojet

Armament ..... One N-37 and two NR 23 cannons.

Performance
Maximum Speed ..... 715 pmh
Service ceiling ..... 52,841 feet
Range ..... 1,038 miles
Crew ..... One



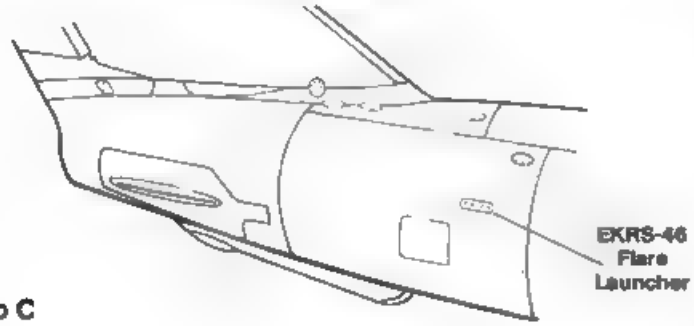


The MiG-17F was designated the Lim-5 in Poland. This Lim-5 (1C-14-16), Red 1426, taxies out past other Lim-5s for another mission. The aircraft has a non-standard radio antenna wire leading from the tail to a post under the canopy. Most Polish Lim-5s lacked this radio antenna.

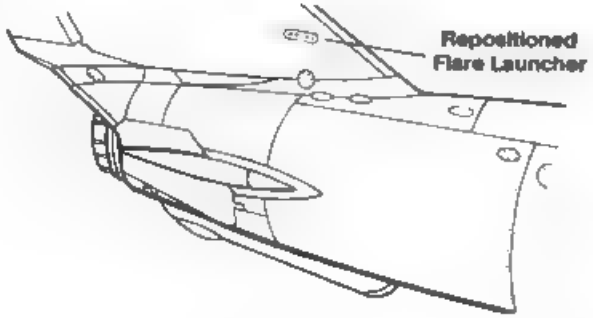
There were only about ten MiG-17Fs imported from the USSR to Czechoslovakia. This early MiG-17F does not carry a SRO-1M radar range finder on the nose or a Syrena 2 tail warning radar. All Czech MiG-17s carried a four digit Black tactical number on the rear portion of the fuselage which differed from other WARSAW Pact countries which all applied the tactical number on the nose.

MiG-17 Fresco A

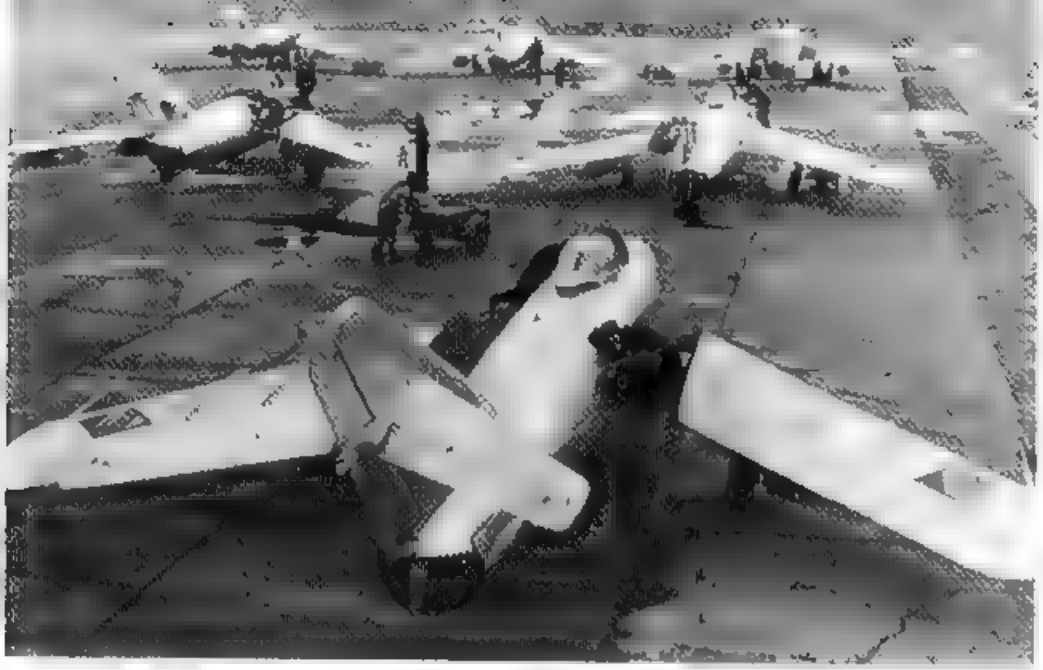
Flare Launcher



MiG-17F Fresco C



Field maintenance of the weapons on the MiG-17F Fresco C was somewhat easier because of its simple and rugged design. The weapons platform has been lowered on Red 17 and the N-37D cannon removed for overhaul. This is a late production MiG-17F with the improved ejection seat and canopy mounted rear view mirror and radar range finder antenna on the nose.

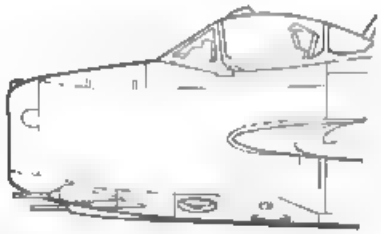


Ground crews prepare East German MiG-17Fs for the upcoming days flights on a foggy autumn morning. The canvas covers on the wing roots helped protect the skin from damage while crews walked on the aircraft. The air intakes and the afterburner nozzles are covered by Red protective covers.

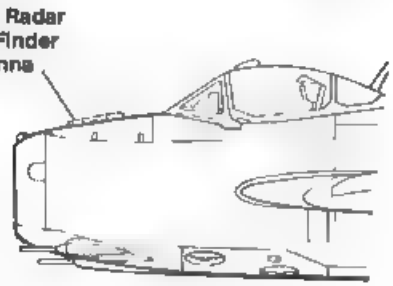
A pair of East German MiG-17F Fresco Cs on patrol over the Baltic Sea. Both aircraft, Red 630 and Red 322, are late MiG-17Fs modified with a SRD-1M radar range finder antenna on the nose in front of the canopy. The MiG-17F was the back bone of East German Air Defense units until it was replaced by the MiG-21F-13 Fishbed from 1962 onward.

Radar Range Finder

MiG-17F (Early)



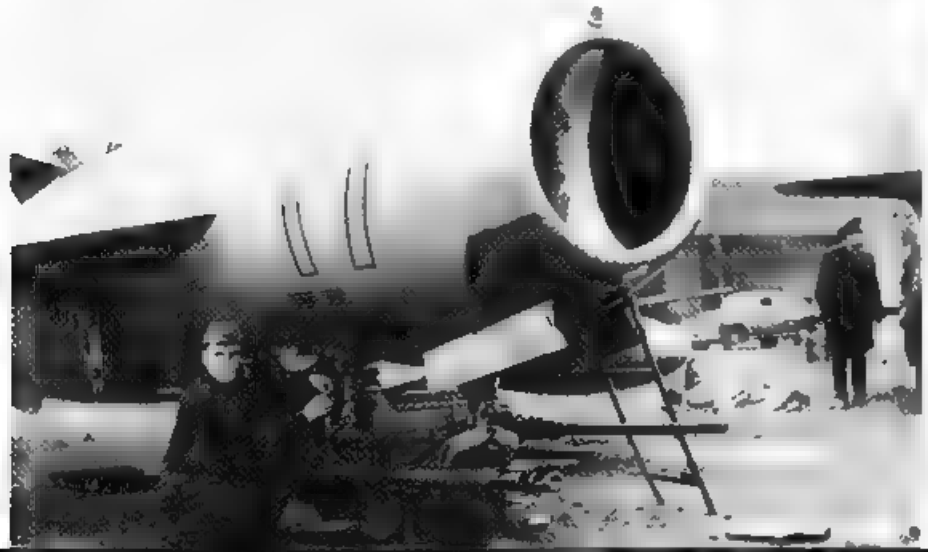
MiG-17F (Late)



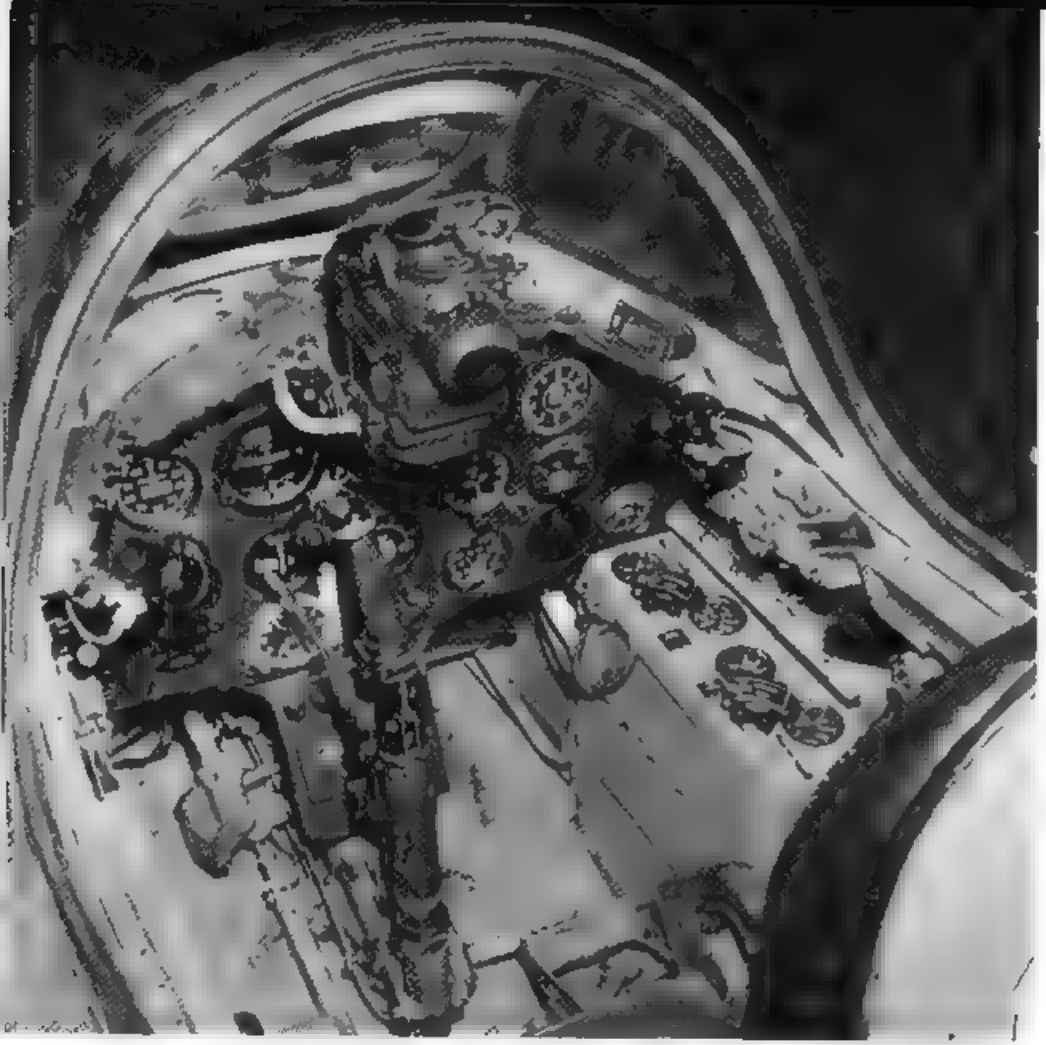
A ground crewman helps a pilot into his MiG-17F Fresco C, Red 413 during the late 1950s. The pilot's flight gear consists of a leather jacket and leather helmet similar to the gear used by USAAF fighter pilots during WWII (some thirteen years earlier). The cannon shell ejection port was faired over.

Soviet Air Force MIG-17F Fresco Cs are prepared for a mission on a pierced steel planking (PSP) ramp. The ground crewman in the foreground has just removed the Red air intake cover from Red 26. The tactical number on all the aircraft has a thin Black outline.

Armament experts perform an overhaul of the N-37D cannon on a Soviet Air Force MIG-17F Fresco C. The weapons platform held all three guns, the ammunition boxes and gun controls. The aircraft tactical number was Yellow with a thin Black outline.



East German Air Force MIG-17Fs Fresco C are prepared for a mission. Most of the MIG-17Fs used by the East German Air Force were built in Poland. These Fresco Cs all the aircraft carry the early style East German national markings which were used between 1956 and late 1959.

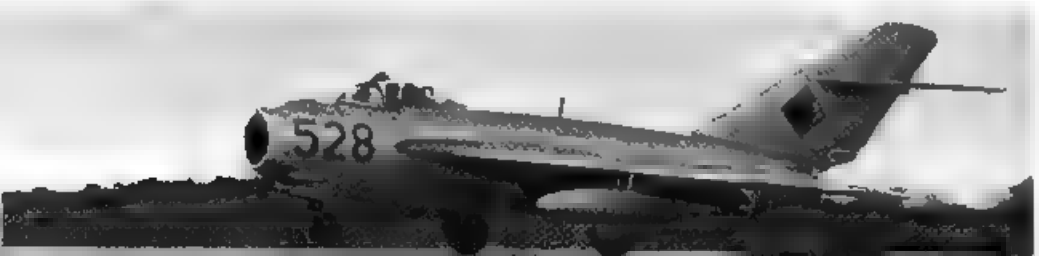


The cockpit of an East German Air Force MiG-17F (Polish-built Lim-5). Most of the Lim-5's cockpit instruments were delivered from the USSR and were in the Cyrillic language, although the East Germans added some cockpit inscriptions in German.

Maintenance personnel perform periodical maintenance on a Polish-built MiG-17F (Lim-5). The ASP-3N gun sight takes up most of the space in the front of the canopy, restricting the pilot's forward view. The ground crewman checking the R-800 radio is a Polish Air Force *Starszy Kapral* (Sergeant).

A ground crewman performs maintenance on the R-800 radio of a Soviet Air Force MiG-17F, Red 19. The black bar on the open nose panel is the antenna for the SRD-1M radar range finder. The range data was automatically fed into the ASP-4N gunsight.

An East German MiG-17F, Red 528, in early style East German markings, rolls out after landing. The first MiG-17Fs were delivered to East Germany during June of 1957. Apart from about five Soviet-built aircraft, all MiG-17s delivered between 1957 and 1958 came from Poland, although East Germany never used the Polish designation, Lim-5.



Combat

The MiG-17F has seen combat in a number of local and regional conflicts around the world. It was introduced into combat during the 1956 Arab-Israel war, the first MiG-17Fs having been delivered to Egypt shortly before the start of hostilities. In March of 1963, the MiG-17 saw combat with the North Yemen Air Force against Royal Air Force Hunters in South Yemen. In August of that same year, Israeli Mirage IIICJ fighters were engaged by Syrian Air Force MiG-17Fs.

During the 1967 Arab/Israeli War a number of Egyptian Air Force MiG-17Fs were modified for use in the ground support role with rocket rails under the outer wing panels and bomb racks under the fuselage. The rocket rails each held four 76MM Sakr unguided rockets. The rockets were built in Egypt and the MiG-17 conversion work was done at the Heluan Aircraft Modification Depot. MiG-17s have been active in every Arab/Israeli war, including the 1973 war where MiG-17Fs saw combat with the both the Egyptian and Syrian Air Forces.

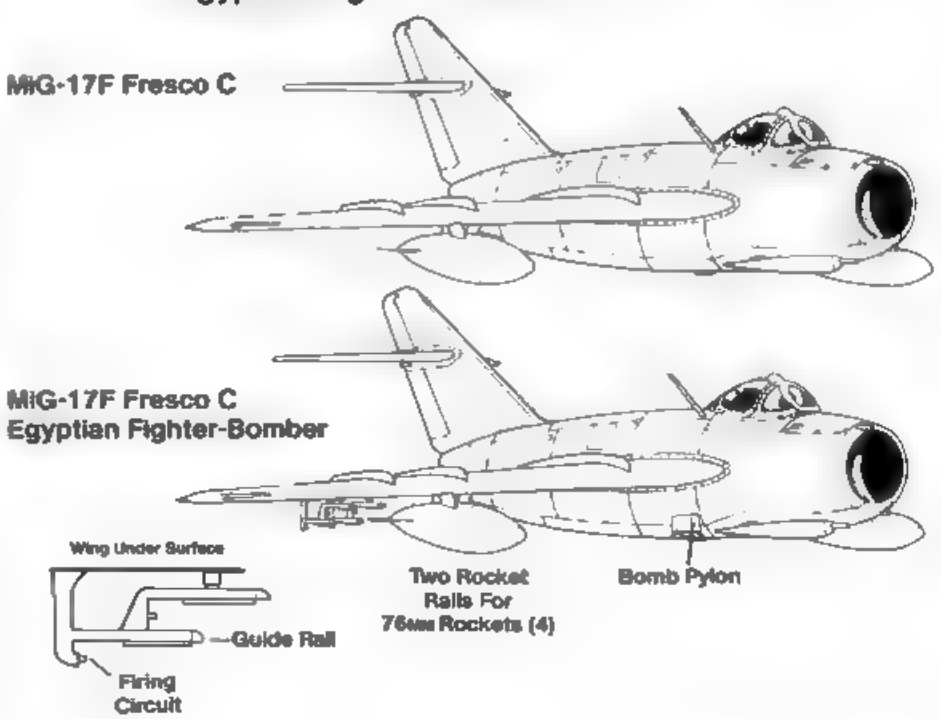
There were also a number of lesser known conflicts where the MiG-17F saw combat. In the bitter Biafra War in Nigeria between 1968 and 1970, Federal Nigerian Air Force MiG-17F s conducted ground support and attack missions over Biafra. The Fresco C also saw action during the border war between Uganda and Tanzania in 1972 and in Mozambique ex-North Korean Air Force Fresco C's flew missions against local rebel forces. In Afghanistan, MiG-17Fs flew alongside the MiG-17 Fresco As delivered earlier, in ground attack missions against rebel strongholds in the mountains.

The MiG-17F saw combat against American forces in Southeast Asia. The Fresco C was the first jet fighter introduced into the North Vietnamese Air Force. The NVAF received its first MiG-17Fs on 6 August 1964. These aircraft were supplied by China and were actually Chinese-built J-5s. On 3 May 1965, a MiG-17F became the first North Vietnamese aircraft to shoot down a U. S. Navy aircraft when LT Pham Ngoc Zan scored a kill on an A-4 Skyhawk. The first U. S. Air Force kill scored by MiG-17s was on 4 April 1965 when four Fresco Cs surprised eight F-105 Thunderchiefs over Thanh Hoa. Two of the MiGs (flown by CAPT Tran Hanh and his wingman) scored cannon hits on two of the F-105s, shooting down both aircraft. This incident was celebrated in the Socialist Republic of Vietnam and 4 April is now known as Aviation Day. The two unfortunate F-105 pilots were CAPT James Magnusson and MAJ Frank Bennett.

On 19 April 1972 Nguyen Van Bai and his wingman, Le Xuan Di, took off from a secret air base in Quang Binh providence and made a surprise bombing attack on two U. S. Navy destroyers that were shelling coastal defense gun sites in the Dong Hoi area. This was the first aerial attack on a Seventh Fleet ship since the Second World War. The two aircraft were modified for this special mission by engineer Truong Khanh Chau, a graduate of the Soviet Zhukovsky Aviation Institute. The aircraft were modified with a drag chute to allow them to use the small forward field and under wing bomb racks capable of holding a 550 pound bomb. One destroyer was hit by a bomb causing minor damage, but one of the MiGs was shot down by a surface-to-air missile fired by the second destroyer.

The primary duty of the NVAF MiG-17F force was to prevent American bombers and fighter-bombers from reaching their targets. Their tactic was to engage the attack force in combat so that they were forced to drop their bomb loads early. The nimble, cannon armed MiG-17Fs could operate from improvised airstrips making detection difficult. They generally patrolled at very low altitude along known American approach and departure routes and when enemy formations were spotted, the Fresco C s climbed in full

The Egyptian Air Force modified their MiG-17Fs, like this aircraft, Black 2975, with underwing rocket rails capable of holding four 76MM unguided rockets. These aircraft were converted at the Aircraft Modification Depot in Heluan. In addition to the rocket rails, the aircraft were also configured with a bomb rack on the fuselage just behind the guns.



afterburner to engage the USN and USAF aircraft. Most American pilots stated that they feared the cannon armed MiG-17F far more than the missile equipped MiG-21PFM Fishbed F.

There were sixty-one MiG-17s shot down by USAF pilots in Vietnam between 10 July 1965 and 14 February 1968. The first MiG-17F kill, however, went to the Navy. On 17 June 1965, two F-4B Phantoms of VF-21 aboard USS MIDWAY ran into four Fresco Cs south of Hanoi and shot down two of the Frescos.

The North Vietnamese Air Force was equipped with a mixture of Soviet built MiG-17Fs and Chinese manufactured J-5s (MiG-17Fs), delivered from both countries. Reportedly, most North Vietnamese pilots preferred the MiG-17 over the more advanced MiG-21PF and MiG-21PFM because of its maneuverability, robust construction and gun armament. Most North Vietnamese aces got their kills flying both the MiG-17F and the MiG-21, including COL Toon. This NVAF pilot was credited with thirteen kills and was the VNAF top scoring ace before he was killed in an engagement against a Navy F-4J Phantom II flown by LT Randy Cunningham and his RIO, LT Willie Driscoll, on 10 May 1972. In addition to COL Toon, Cunningham and Driscoll had shot down two other MiG-17Fs that same day.

Known NVAF aces include Nguyen Van Bai who downed seven enemy aircraft. His first kill was made on 24 April 1967 and all his kills were made flying the Fresco. Nguyen Van Coc scored nine kills, while Luu Huy Chao, Mai Van Cuong, Pham Thanh Ngan and Nguyen Hong Nhi all scored eight kills. These pilots had all gained at least a portion of their victories flying the MiG-17F.

During the entire Vietnam conflict, the Americans lost twenty aircraft to the MiG-17F and the VNAF lost a total of ninety-two Fresco Cs for a kill ratio of 4.6 to 1 in favor of the Americans. A part of this success can be credited to the fact that the USAF and USN had been able to obtain two MiG-17Fs through clandestine channels (officially the USAF never acknowledged that they possessed these Fresco Cs).

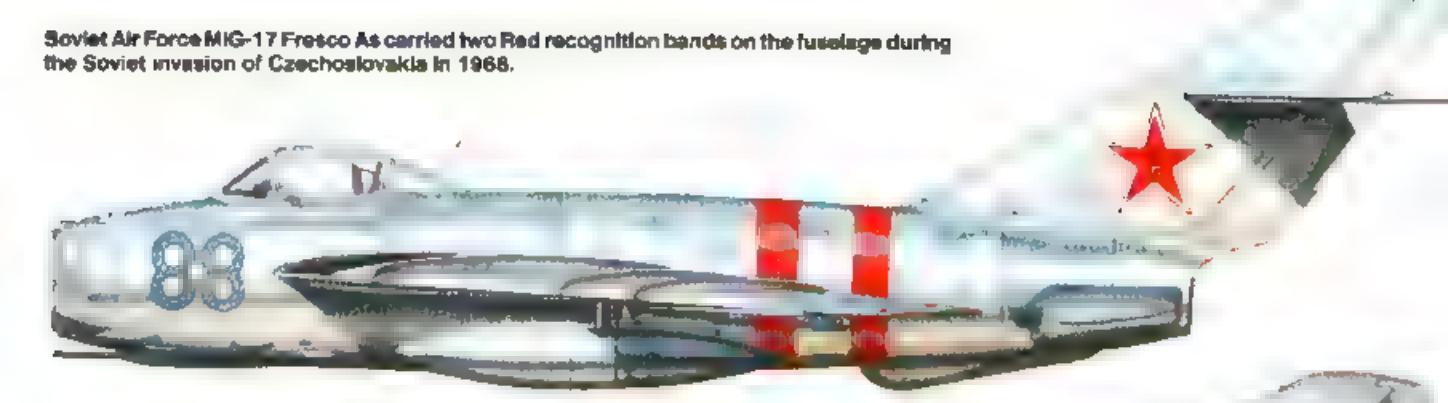
The two aircraft were ex-Syrian Air Force aircraft captured by the IDF/AF. On 12 August 1968, during a routine training mission, two Syrian Air Force pilots, Valid Adham

A MiG-17F, Black NAF 625, of the Nigerian Air Force during the Biafran Civil War. Those aircraft that survived the war were based at Kano Air Force Base and served in the fighter bomber role. Later they were replaced by MiG-21MF and British Aerospace Jaguars. The ladder on the aircraft was Red.

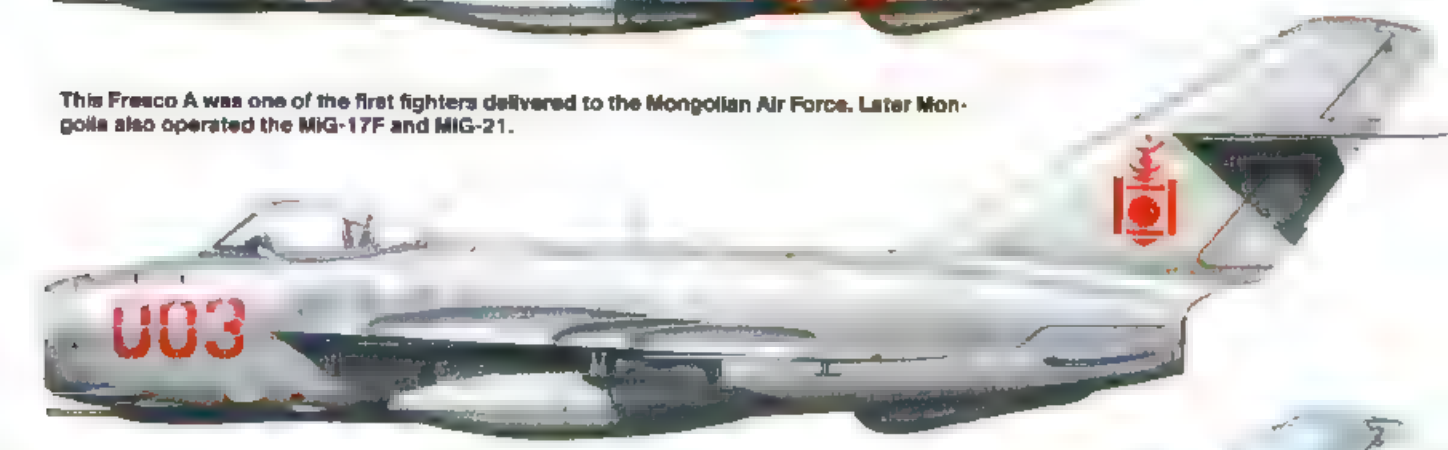
A MiG-17F Fresco C fighter-bomber, Red 2975, of the Egyptian Air Force on the ramp at Cairo West Air Base during the joint U.S./Egyptian exercise known as Bright Star 81. The exercise was held during December of 1981.

Nigerian Air Force MiG-17Fs saw action during the bitter Biafran Civil War (1968 and 1970). Nigerian MiG-17s carried a variety of national markings. Black NAF 624 has a fin flash, while the MiG-17F in the background carried the national roundel (Green-White-Green) in the fin. These aircraft were ex-Egyptian Air Force aircraft.

Soviet Air Force MiG-17 Fresco As carried two Red recognition bands on the fuselage during the Soviet invasion of Czechoslovakia in 1968.

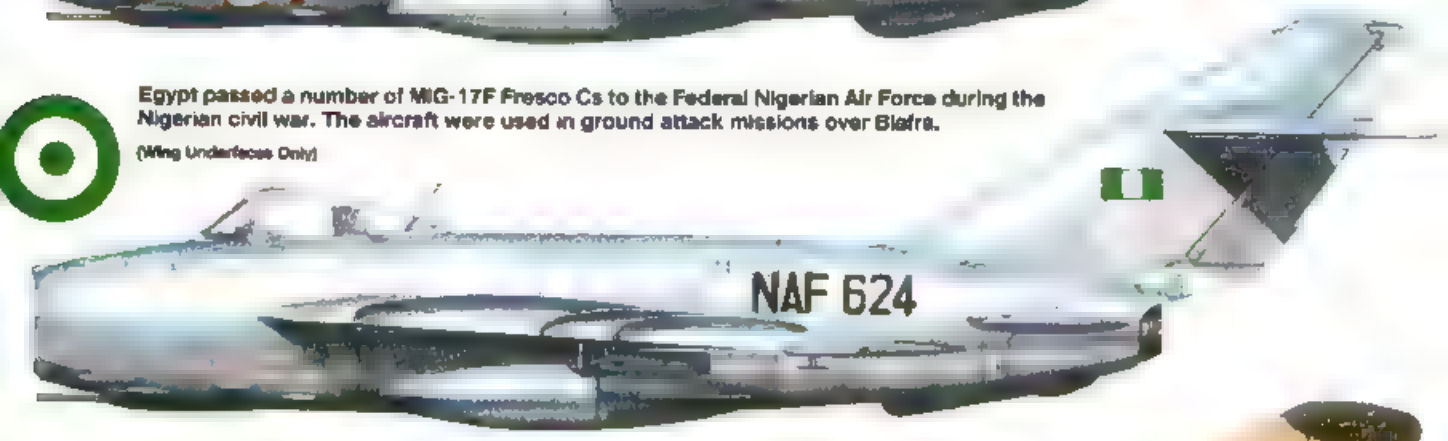


This Fresco A was one of the first fighters delivered to the Mongolian Air Force. Later Mongolia also operated the MiG-17F and MiG-21.

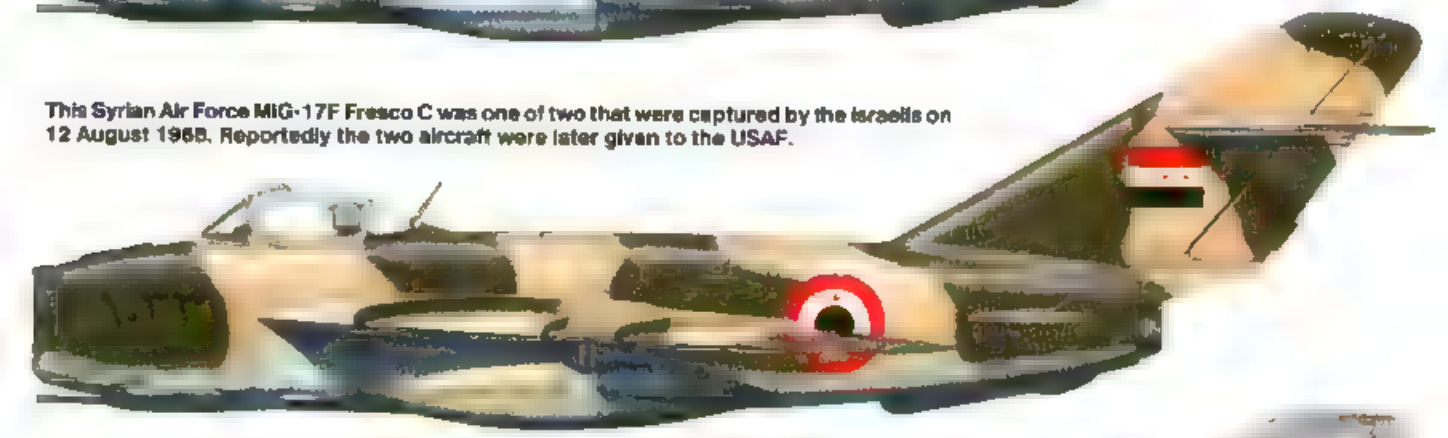


Egypt passed a number of MiG-17F Fresco Cs to the Federal Nigerian Air Force during the Nigerian civil war. The aircraft were used in ground attack missions over Biafra.

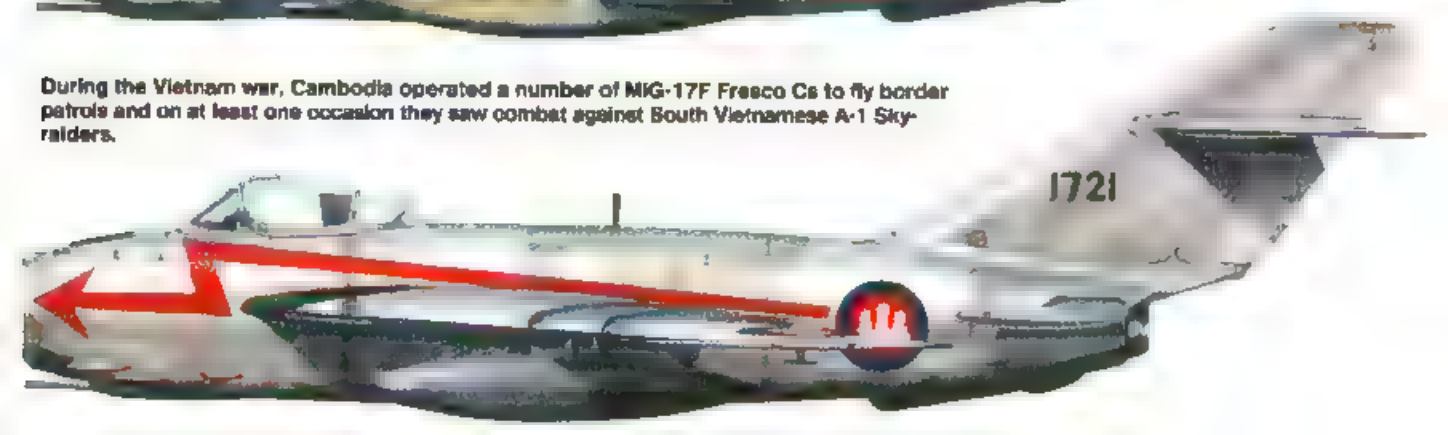
(Wing Undersides Only)



This Syrian Air Force MiG-17F Fresco C was one of two that were captured by the Israelis on 12 August 1968. Reportedly the two aircraft were later given to the USAF.

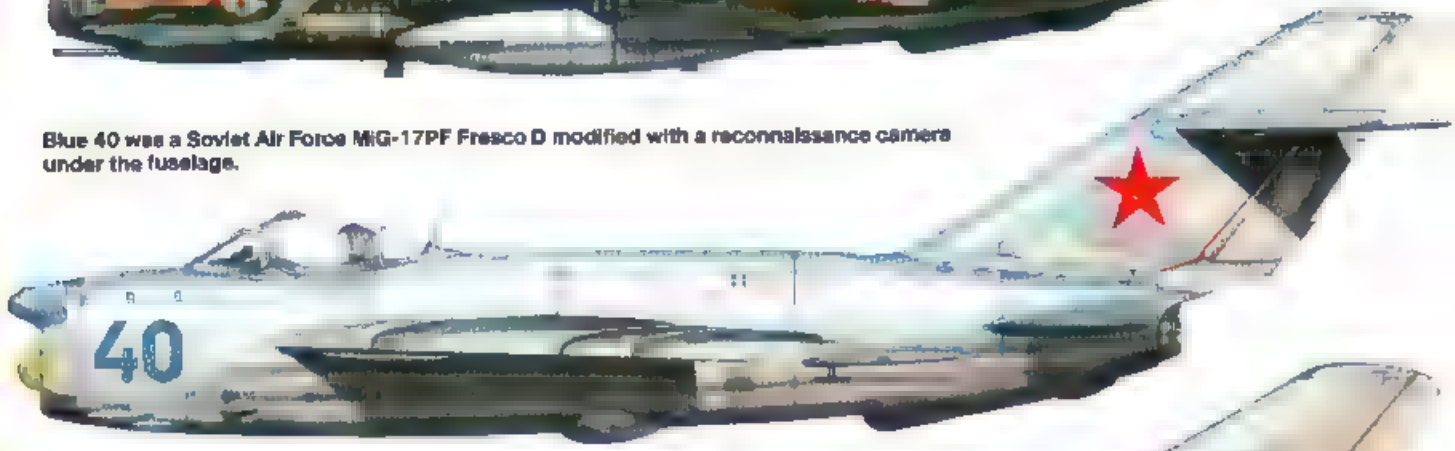


During the Vietnam war, Cambodia operated a number of MiG-17F Fresco Cs to fly border patrols and on at least one occasion they saw combat against South Vietnamese A-1 Skyraiders.

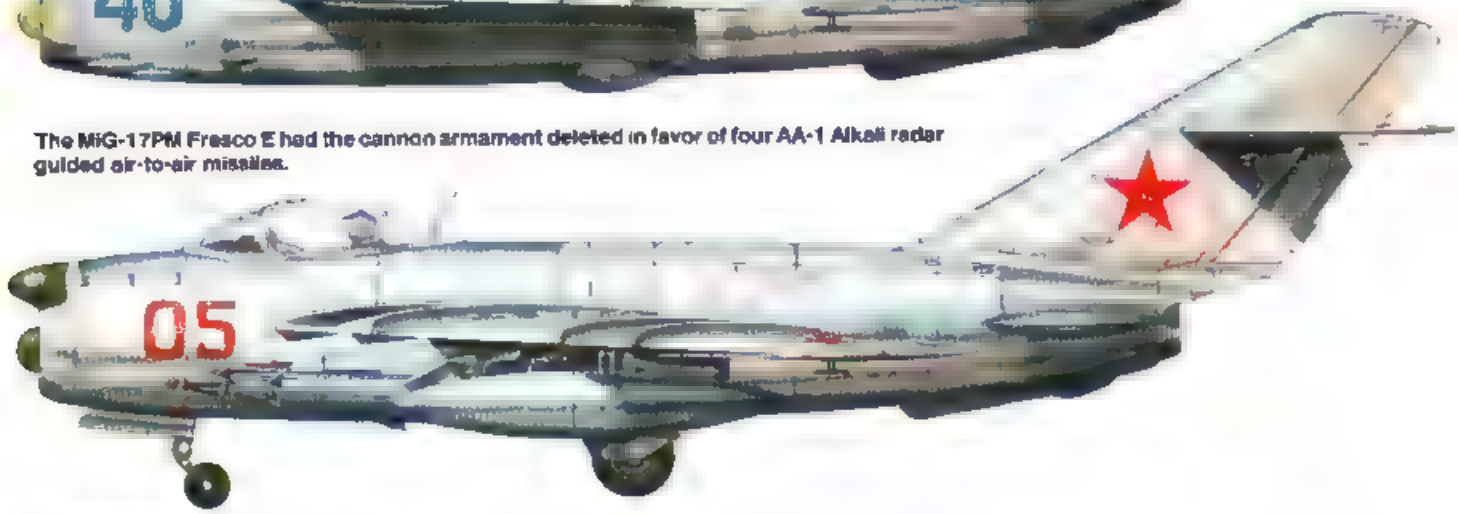


A very worn Lim-5bis of the Polish Air Force. The Lim-5 was a Polish fighter-bomber development of the MiG-17F Fresco C.

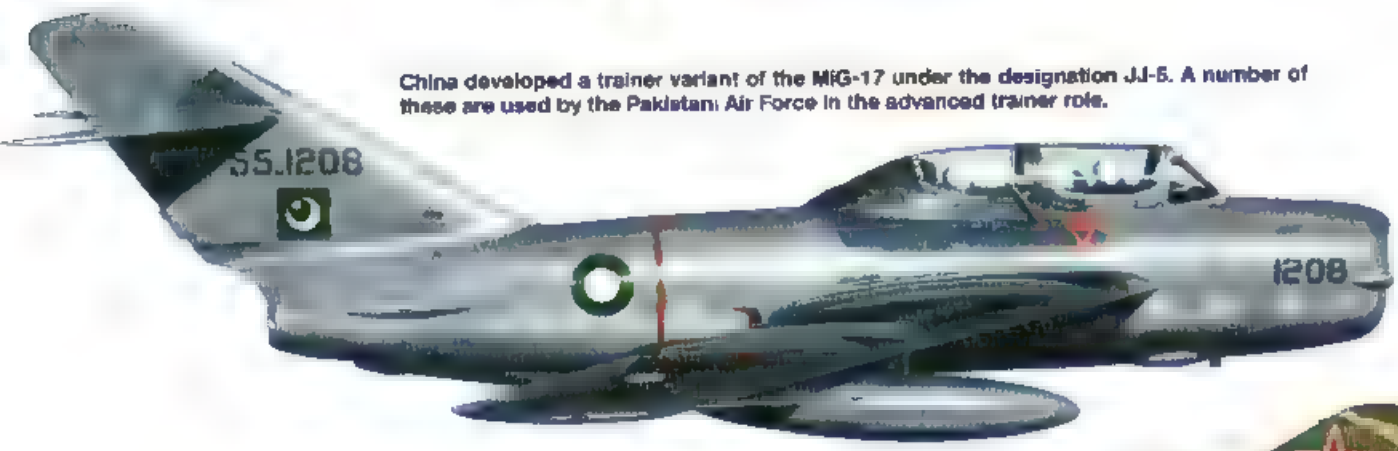
Blue 40 was a Soviet Air Force MiG-17PF Fresco D modified with a reconnaissance camera under the fuselage.



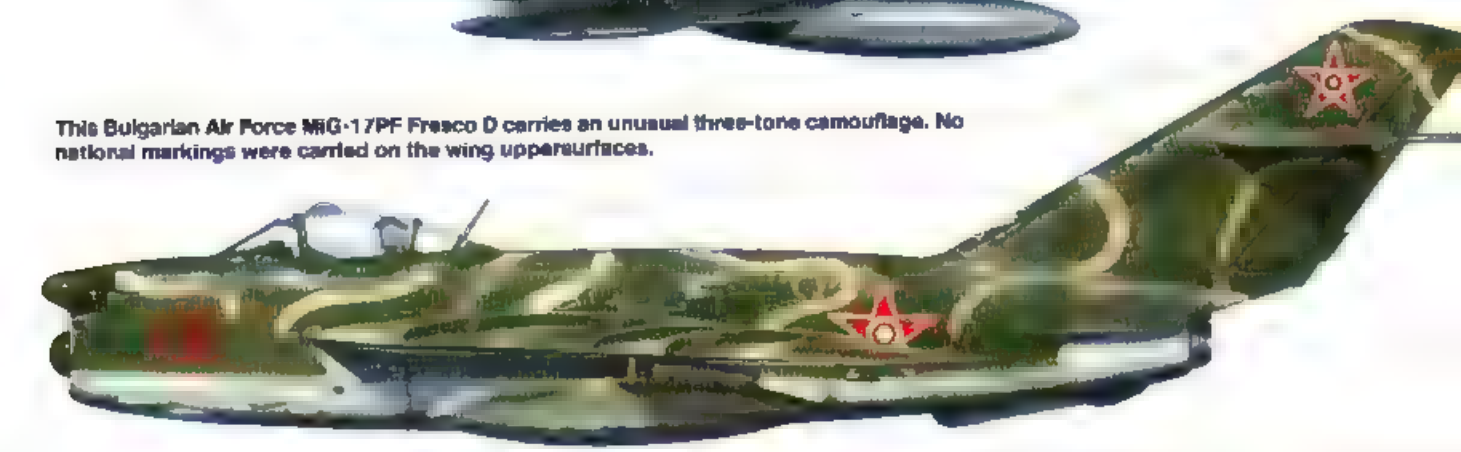
The MiG-17PM Fresco E had the cannon armament deleted in favor of four AA-1 Alkali radar guided air-to-air missiles.



China developed a trainer variant of the MiG-17 under the designation JJ-5. A number of these are used by the Pakistani Air Force in the advanced trainer role.



This Bulgarian Air Force MiG-17PF Fresco D carries an unusual three-tone camouflage. No national markings were carried on the wing uppersurfaces.



and Radfan Rifat, became lost. They were flying two camouflaged Fresco Cs, Black 1033 and Black 1041, and landed by mistake (some say they were lured by a Arabic speaking Israeli) at Betset landing strip in Western Galilee. Immediately after landing, both pilots were captured by the IDFAF and the MiG-17Fs were closely inspected and test flown by the IDFAF.

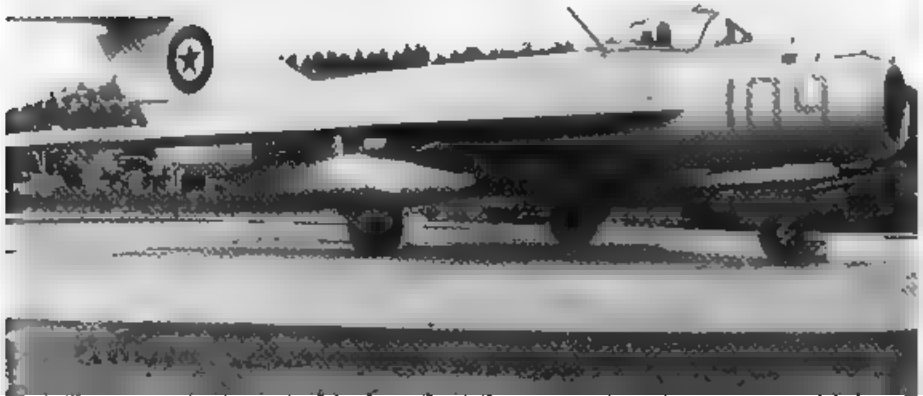
Sgan Aloof (LCOL) Dani Shapira was briefed to evaluate the MiG-17F. This was not the first time LCOL Shapira flew a Soviet built aircraft. he had previously tested the MiG-21F-13, Black 534, ex-Iraqi Air Force which had been delivered to the IDFAF by its pilot, Monir Radfa, on 16 August 1966. The two MiG-17s were repainted with IDFAF markings and Red recognition markings and test flown from Hatzor AFB. The MiG-17Fs remained in Israel until 1969 when they were shipped, along with the MiG-21F-13 to the United States. All three aircraft were part of a larger deal involving arms deliveries to Israel after the Six Day War. One of these MiG-17s was reportedly flown by Navy pilots at NAF China Lake as part of the formation of the Navy Fighter Weapons School — Top Gun.

In 1988, Combat Core Certification Professionals, a small firm which mainly purchased MiG aircraft for museums and movie makers, imported a number of Polish manufactured Lim-5s (MiG-17Fs) and Lim-6Ms (MiG-17PFs) for the Defense Test and Support Evaluation Agency (DTESA). These aircraft were all cleared for export by the Polish Government due to the country's desperate need for Western currency. Besides the MiG-17s a number of MiG-21s were also imported from Poland and Hungary.

These aircraft were to be used in the air combat training role and at least one exercise was conducted at Kirtland AFB, New Mexico during the Fall of 1988. The entire program seems to have suffered a setback, due to the sole source procurement of the aircraft, which violated Defense Department policy. As a result, the aircraft were reportedly placed in storage at Kirkland until the legal problems with the contract can be worked out.

A Cambodian Air Force MiG-17F, Black 1721, shares the ramp at Ton Son Nhut Air Base with VNAF F-5s during February of 1972. The aircraft is equipped with an SRO-1 IFF antenna in Black on the fuselage spine and an SRD-1M radar range finder antenna on the nose. The arrow on the fuselage was in Red.

This Afghan Air Force MiG-17 Fresco A, Blue 109, has a damaged underwing fuel tank. The aircraft carries the late style Afghan national insignia first introduced during 1982.

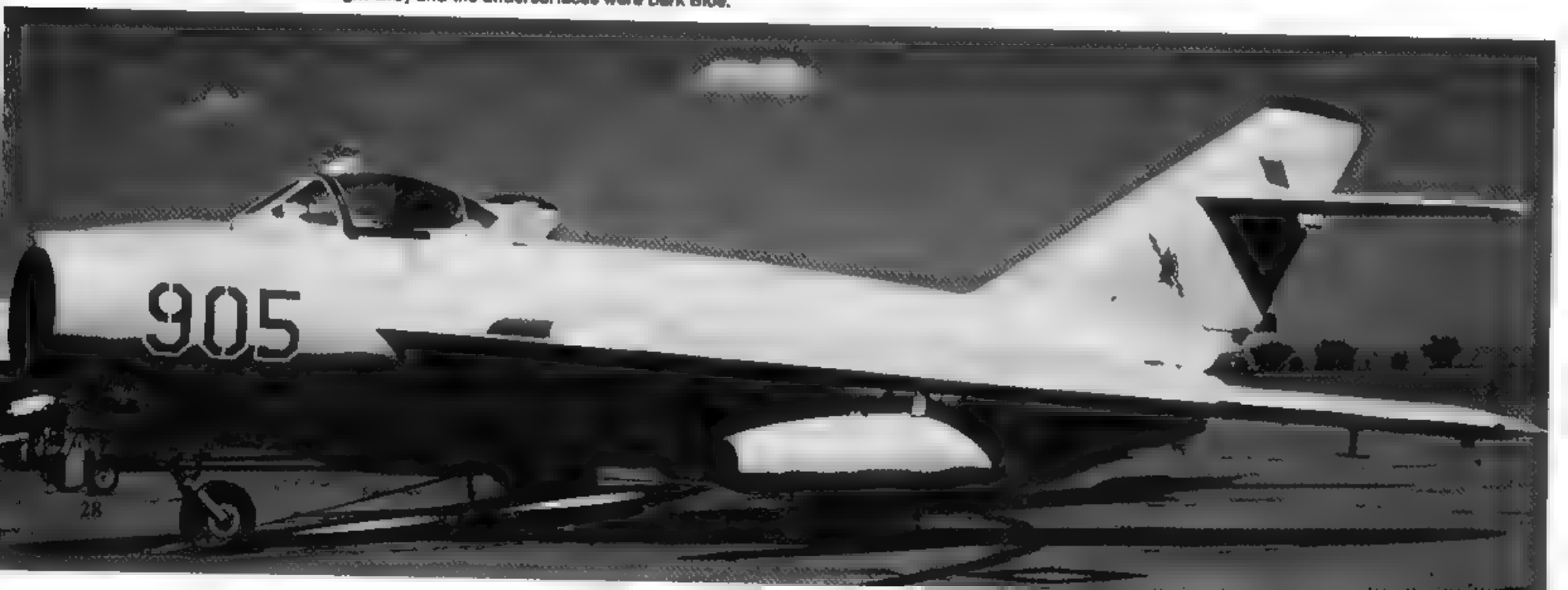


Although COL Toon's MiG-17F Fresco C was destroyed, a number of MiG-17s have been painted to represent his aircraft. This MiG-17F at the Air Force Museum in Dayton, Ohio carries the camouflage and markings of Toon's North Vietnamese Air Force MiG-17F.

Two Syrian Air Force MiG-17Fs were captured by the Israelis when they landed by mistake at Betset air field on 12 August 1968. Both pilots, Valid Adham and Radfan Rifai, were taken in custody as POWs. The aircraft in the foreground was Black 1041 (in Arabic numbers on the nose) and the aircraft in the background was Black 1033.

A Syrian Air Force MiG-17F, Black 1033, is inspected by an Israeli technician. Both aircraft were test flown by Sgan Aloof (LCOL) Dani Shapira. Later both Fresco Cs, along with an ex-Iraqi MiG-21F-13, were delivered to the United States during 1969. The USAF never officially acknowledged that they had two flyable MiG-17Fs.

A Lim-5 (1C-09-05) of the DTESA (Defense Test and Support Agency). These aircraft were purchased from Poland by Combat Core Certification Professionals under a DOD contract. The aircraft were used in the training role during an exercise held at Kirkland AFB in September of 1988. The DTSA emblem on the fin was in Dark Gray, the tactical number and fin tip was in Red, the uppersurfaces were Light Gray and the undersurfaces were Dark Blue.



East German MiG-17F Fighter-Bomber

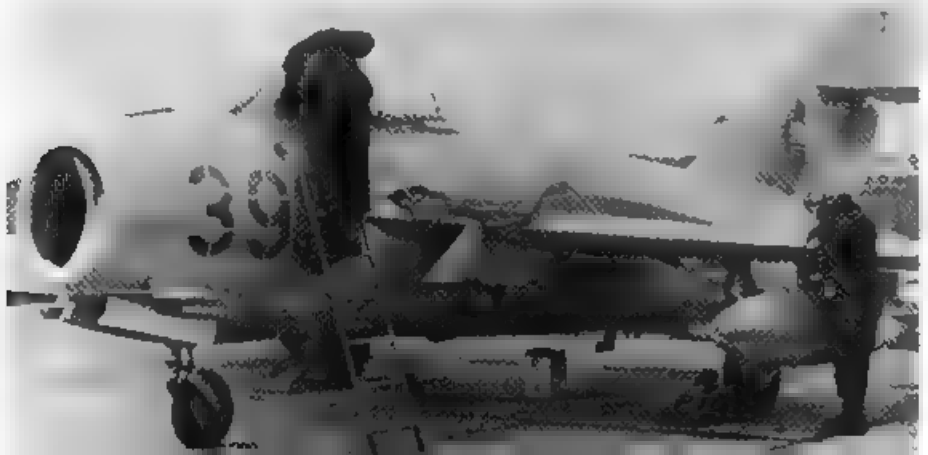
In 1962, the MiG-21F-13 began to replace the MiG-17F in the Fighter Interceptor Regiments of the East German Air Force. Until the early seventies, the primary mission of WARSAW Pact air forces had been air defense of their respective countries. After that time, there was a change of policy and the WARSAW Pact countries began creating fighter-bomber regiments to support their ground troops. This was a politically sensitive issue in East Germany and the creation of fighter-bomber regiments within the *Luftstreitkräfte* was kept secret in order not to provoke NATO.

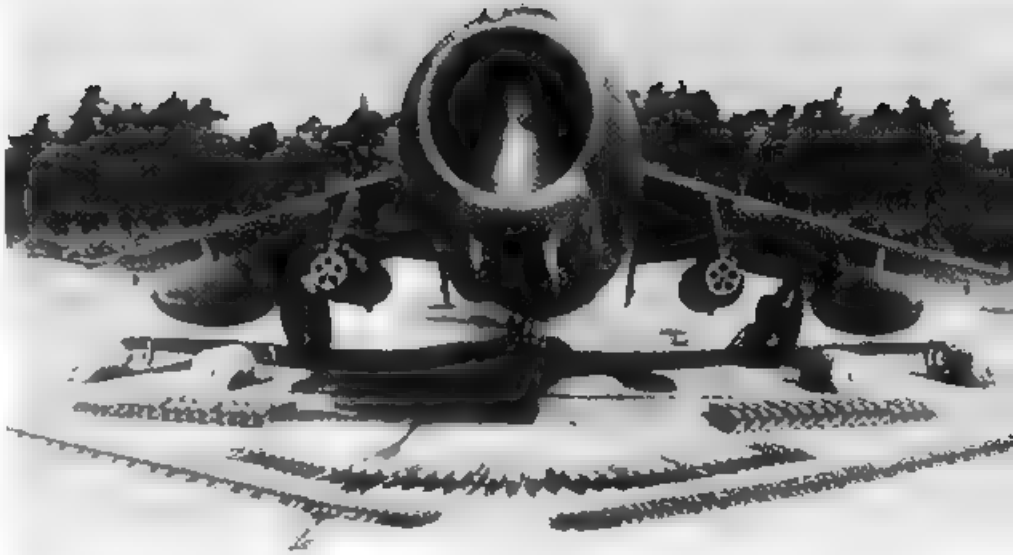
During 1973, the East German Air Force began to convert a number of MiG-17Fs to the fighter-bomber role at the Repair and Overhaul Depot in Dresden. The conversion used components imported from Poland, including the underwing weapons pylon, MARS-2 rocket pods and RV-UM radio altimeter and its antennas, which had been developed for the Polish fighter-bomber conversion of the MiG-17F. Other changes included the introduction of an ASP-4NM gunsight and avionics changes.

Although based on the Polish conversion, the East German MiG-17F did not use the SH-19 braking parachute that was housed in a container at base of the rudder on the Polish aircraft. The underwing pylon for the MARS-2 rocket pods was installed in the same position as on the Polish conversion. Additionally, the T shaped RV-2 radio altimeter antennas were deleted from under the wings and replaced by two RV-UM antennas which were installed on the fuselage underside along the aircraft centerline.

The fighter-bomber MiG-17Fs were initially flown in an overall Natural Metal finish. Later, they were camouflaged in Earth Brown and Olive Drab uppersurfaces over Light Blue undersurfaces. The aircraft were assigned to *Jagdbombenfliegergeschwader* 37 (Fighter-Bomber Regiment 37), *Klement Gottwald* based at Drewitz near the Polish border. The last ground attack MiG-17Fs were withdrawn from service during 1986, being phased out in favor of the MiG-23BN Flogger H. The Floggers served until the German Democratic Republic was dissolved.

This MIG-17F of JBFG 37 *Klement Gottwald* based at Drewitz near the Polish border was one of the East German fighter-bomber conversions produced by *Flugzeugwerke Dresden* during 1973. Besides the underwing weapons pylon, the aircraft also carried RV-UV radio altimeter antennas on the fuselage undersurface. These replaced the small T shaped antennas normally mounted under the wings.

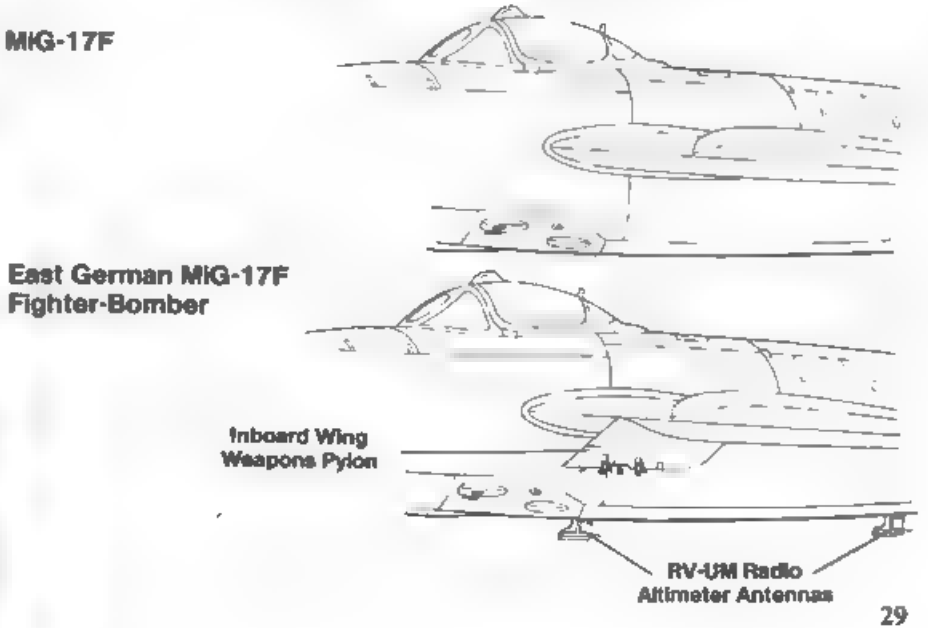




This display of the weapons load carried by East German fighter bomber MiG-17Fs was part of a base open house. In the foreground are two eighty round belts of 23MM ammunition, one belt of 37MM ammunition, sixteen S-5 rockets for the MARS-2 rocket pods and four PROSAB-250 cluster bombs which can be carried in place of the MARS-2 pods.

During September of 1990, just one month before Germany was reunited, there were a number of ground attack MiG-17Fs in storage at Drewitz. Reportedly the aircraft were being sold to Mozambique. It is not known if the sale actually went through and if the aircraft were ever delivered.

East German Fighter-Bomber

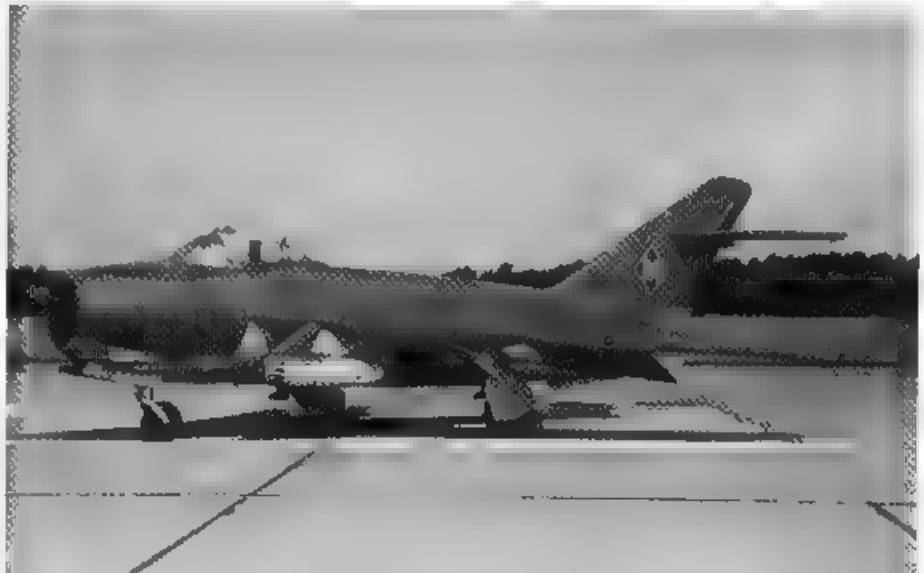


A fighter-bomber MiG-17F, Red 346, is readied for a mission at Drewitz. The aircraft conversion was accomplished using components imported from Poland. The aircraft's air intake is covered by a Red protective cover with the aircraft's tactical number repeated on the cover in small Black numbers.

Two MiG-17F fighter-bomber conversions share the ramp at Drewitz with a camouflaged MiG-15UTI Midget. Reportedly, most of the MiG-17Fs were in the process of being sold to Mozambique when the two German Republics were reunited. It is unknown if the deal ever actually went through.

A MiG-17F fighter-bomber conversion of JBFG 37 taxies out from its base at Drewitz. The converted MiG-17F could easily be distinguished from the standard air defense MiG-17Fs of the *Luftstreitkräfte* by the underwing pylon, centerline RV-UV radio altimeter antennas and tactical camouflage.

When the MiG-17F fighter-bombers were replaced by MiG-23BNs, Red 346 was salvaged by some mechanics. Later the aircraft was restored and during July of 1991, it was one of two remaining MiG-17s at Drewitz Air Base (the second aircraft was a gate guard). (Marcus Fülber)



Shenyang J-5

The first Five-Year Plan created by the Chinese Communist Party called for local manufacture of both jet fighter aircraft and trainers. During December of 1951, a plan was submitted stating that production should start within three to five years. In May of 1953 China and the Soviet Union signed an agreement where the Soviets would assist China in some 156 projects, among these were thirteen projects relating to the aviation industry.

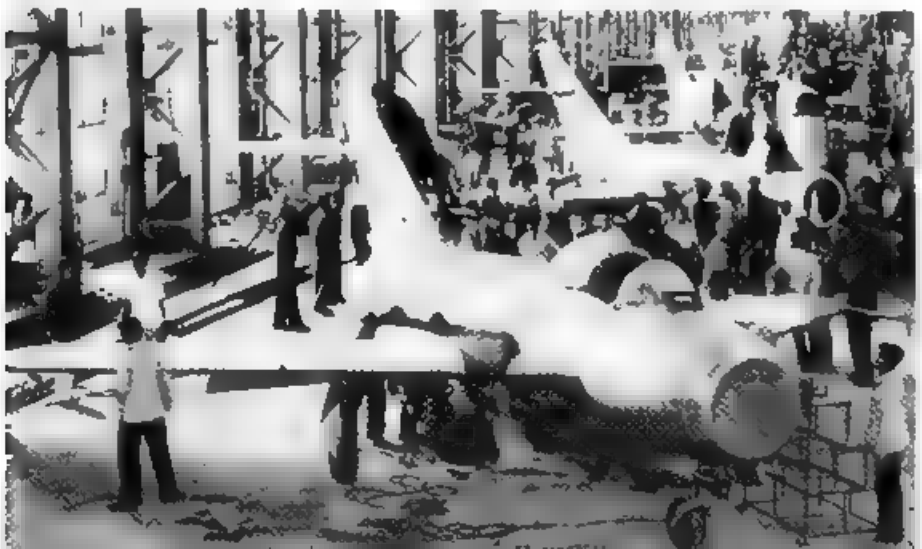
Under Soviet leadership, the Shenyang Aircraft Factory, which had started as an aircraft repair shop, was modernized and expanded. Also at Shenyang, the Chinese built the Aero Engine Factory which was intended to produce Soviet jet engines. Initially it was planned to manufacture the MiG-15bis under license at Shenyang, however in October of 1954 the plans were changed and it was decided to undertake the license manufacture of the MiG-17F under the designation J-5. The Chinese also undertook the manufacture of the VK-1F power plant under the designation WP-5.

Documentation for the MiG-17F arrived during 1954 and in April work began to translate these documents. Prototype production started in early 1955 at Shenyang with the Soviet Union supplying a complete set of drawings, technical documents, details of the manufacturing processes and most of the tooling. The Soviets also supplied two MiG-17Fs to serve as pattern aircraft, fifteen knocked-down kits, forging and raw materials for ten aircraft, vendor furnished equipment for eight aircraft and standard parts for fifteen aircraft.

Final assembly of the first aircraft assembled with parts totally manufactured in China was completed on 13 July 1956. On 26 July a full size airframe passed its static test and on 2 August the first flight test was completed.

On the 1956 National Day, Chinese manufactured J-5s were shown to the public for the first time when a formation of four early production Fresco Cs flew over Tian An Men Square in Peking. Production of the J-5 grew steadily, there were seventeen built in 1956, 142 the following year, 429 in 1958 and another 179 in 1959. A total of 767 J-5s were manufactured between 1956 and 1959, with production of the J-5 at the Shenyang Aircraft Factory lasting only one year longer than production of the MiG-17F in the USSR.

The Chinese built the MiG-17F under license at the Shenyang Aircraft Factory under the designation J-5 (F-5). The first J-5 produced with all Chinese manufactured parts rolled out on 13 July 1956. A total of 767 J-5s were built between 1956 and 1959.



The J-5 was generally similar to the MiG-17F, although it did not carry the Syrena 2 tail warning radar and, while the Soviet MiG-17Fs had a single access panel on the port side of the nose, the J-5 has an access panel on both sides. Most J-5s carried an SRU-01FF blade antenna on the fuselage spine, but J-5s never carried the SRD-1M radar range finder or button ECM antennas.

J-5s were assigned to combat regiments of the Peoples Liberation Army Air Force and Navy and have seen combat in a number of incidents. According to Chinese sources two Nationalist Chinese F-84Gs and six F-86s were shot down by the PLAAF J-5s during 1958. On 7 October 1959, a Navy J-5 shot down a Chinese Nationalist RB-47D, which was returning to Taiwan from a spy mission over northern China. The Nationalist pilot, for some unknown reason, started his descent while still over China and came within range of the J-5.

JJ-5

There was no two seat trainer version of the MiG-17 produced in the Soviet Union since it was considered that the handling characteristic of the MiG-17 were so similar to those of the MiG-15 that pupils could easily transition from the two seat MiG-15UTI Midget to the MiG-17.

The situation in China, however, was different. During the late 1950s, the Soviet Union had supplied a number of MiG-15UTIs (JJ-2), but there was no production of the Midget in China. As time progressed it became apparent that these aging MiG-15UTIs would have to be replaced by a trainer of Chinese design.

Final assembly of a J-5 (MiG-17F) at the Shenyang Aircraft Factory. The Fresco C was up on jacks to perform the drop checks for the landing gear. The air intake is covered with a Red protective cover and the canopy was also covered with a protective covering.

Chinese maintenance crews work on a J-5, Red 63243 on a Peoples Liberation Army Air Force base. The Shenyang-built Fresco C differed from the Soviet built MiG-17Fs in having a small access panel on the port and starboard sides of the nose. Soviet Fresco Cs have this panel on the ports side only.

A Shenyang J-5 shares the ramp of a Peoples Liberation Army Air Force base with JJ-5 trainers. The full third (JJ-5) and fifth (J-5) aircraft in the row are fully covered with canvas covers. The J-5 was introduced to the public and foreign observers on the 1956 National Day fly-over when four J-5 flew over the Tian An Men Square.

This J-5, on the ramp at Chino, California was purchased by an American warbird collector. The aircraft received the civil registration N1VC and was fully restored by Sierra Hotel, a warbird restoration firm in Addison, Texas.

N1VC was fully restored back to its Chinese Peoples Liberation Air Force markings by Sierra Hotel at Additon, Texas. The small antenna next to the cockpit was a communications antenna added to the aircraft to allow it to be flown on U.S. airways. The tactical number was Red with a thin Yellow outline.

In 1965, the Ministry of Aviation Industry decided to develop a fighter trainer the JJ-5 (JJ, *Jianjiu Jiaolianji* or fighter-trainer) which was based on the J-5A (MiG-17PF) built at the Chengdu Aircraft Factory. Production of the JJ-5 was to be done at Chengdu, since the Shenyang Aircraft Factory was occupied in building the J-6 (MiG-19).

Since the JJ-5 was based on the J-5A, it used the larger access panel on the fin that was common to the J-5A rather than the smaller panel used on the J-5. As part of the JJ-5s development, the Chinese used many components from the MiG-15UTI including the cockpit section. The two cockpits are separated by a glass screen and each had their own individual pressurization systems. By using this method, there is no loss of cabin pressure in the second cockpit should one of the canopies be lost.

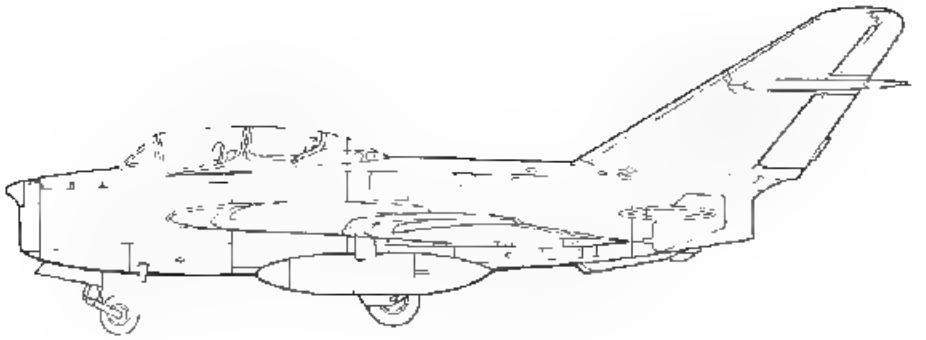
The front cockpit controls are automatically disconnected whenever the instructor in the rear cockpit took control. The rear cockpit canopy opens to the rear while the front cockpit canopy opens to starboard. The communications system used in the JJ-5 is a Chinese version of the Soviet SPU-2P intercom.

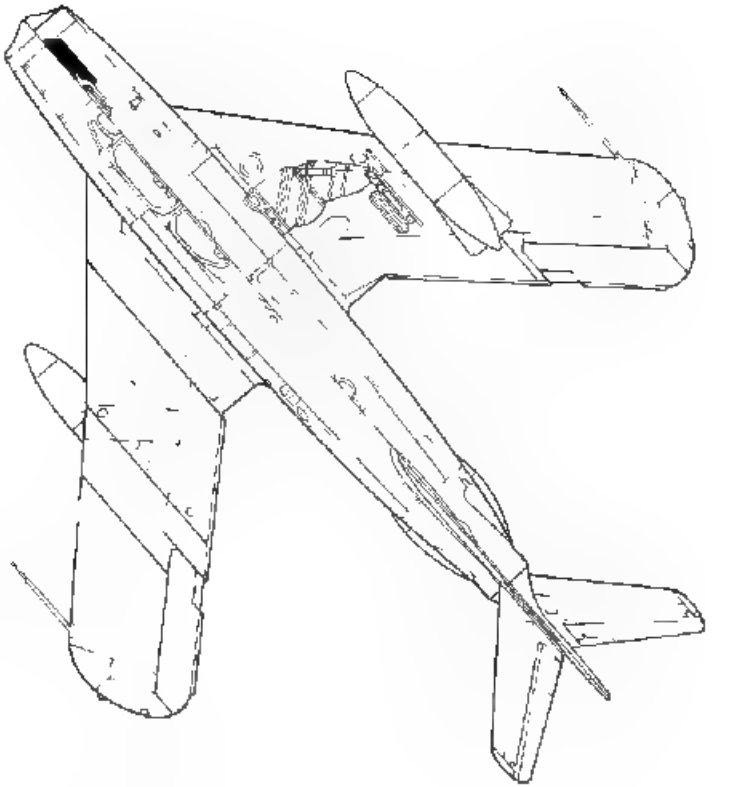
The JJ-5 has a small radome mounted above the intake giving the nose a definite lip. This radome houses a radar ranging gun sight. The S-13 gun camera is mounted on the starboard side of the nose and the aircraft is armed with a single 23-1 cannon on the starboard side of the nose. This gun is the Chinese version of the Soviet NR-23 23MM cannon. The JJ-5 is powered by a non-afterburning WP-5D engine (based on the Soviet VK-1A engine) and, as a result, the rear fuselage contour is different than the J-5 and J-5A.

The JJ-5 flew for the first time on 8 May 1966 and after certification by the State Certification Group, it was ordered into production during late 1966. Operations in military service revealed that the JJ-5's overall performance was better than that of the MiG-15UTI. The Midget had fairly pronounced pitch up tendencies at high angles of attack and could not be classed as a forgiving aircraft. On the other hand, the JJ-5 has less critical handling characteristics and, as a result, can be used for basic, advanced and air combat training.

A total of 1,061 JJ-5 were produced before production was phased out during late 1986. The aircraft was also exported under the designation FT-5 and TF-5 to Bangladesh, Pakistan, Sudan and Tanzania. The first country to receive the FT-5 was Pakistan which acquired its first FT-5 during 1974. Four years later an additional twenty aircraft were imported from China and the FT-5 replaced the Lockheed T-33A as the standard advanced trainer for the Pakistani Air Force. Most of Pakistani FT-5s are assigned to the No 1 Fighter Conversion Unit where they operate alongside TF-6 Farmers and TF-7 Fishbeds.

A JJ-5, Red 63549, of the Chinese Peoples Liberation Army Air Force taxies along the runway at its home base. There were at total of 1,061 JJ-5 manufactured between 1966 and 1986 at the Chengdu Aircraft Factory. The JJ-5 has the S-19 gun camera on the starboard side and is armed with single NR-23 cannon.





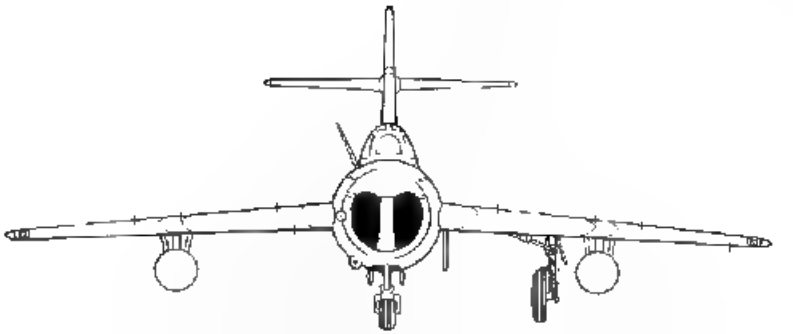
Specifications

Shenyang JJ-5

Wingspan ..... 31 feet 7 inches
Length ..... 37 feet 8 inches
Height ..... 12 feet 3 inches
Empty Weight ..... 8,995 pounds
Maximum Weight 13,720 pounds3
Powerplants ..... One 5,952 Wopen-5D non-afterburning turbojet

Armament ..... One 23мм cannon

Performance
Maximum Speed ..... 482 mph
Service ceiling ..... 46,915 feet
Range ..... 764 miles
Crew ..... Two



A PAF FT-5 (55-1136) prepares to taxi out for another training mission. The first FT-5 entered the PAF inventory on 28 April 1975. Since that time the FT-5 has become the standard advanced trainer, replacing the Lockheed T-33A. (Peter Steinemann)

This overall Natural Metal Pakistani Air Force FT-5 (JJ-5) carries the serial 55-1202 on the fin and has the last four digits of the serial repeated on the nose. The FT-5 was modified with items of western equipment for service in Pakistan. (Peter Steinemann)

The PAF has recently begun a program of repainting their FT-5s, like 55-1208, in a two tone Gray over Blue tactical camouflage scheme. Most of the FT-5 fleet will be repainted during their next scheduled overhaul. (Peter Steinemann)

An overall Natural Metal Bangladesh Air Force FT-5 on the final approach to Tezgaon Air Base near Dacca. The tactical number "Black 724" is painted on the nose, while a the serial 1724 is carried in Black below the fin flash on the tail. (Peter Steinemann)

Polish Built MiG-17s

Poland began production of the MiG-17F Fresco C during November of 1956 under the designation Lim-5. During this same time frame, the Polish Air Force began searching for a replacement for its Il-10 piston engined ground attack aircraft and after careful evaluation of several proposals it became apparent that the Lim-5 would be the best basis for a ground attack aircraft. The specification for the conversion was jointly drafted by the Polish Air Force Command, the Science Research Institute of the Air Force and a team of engineers from the WSK-Mielec factory where the Lim-5 was produced.

The new project was given the designation "CM" and was lead by Feliks Borodzik. Two standard Lim-5s (serials 1C-10-30 and 1C-16-01) were converted for testing. In order to improve the aircraft's STOL capabilities the wing area was increased from 243.2 feet to 252.2 feet by extending the wing root area forward. The wing root area (out to the first wing air flow fence) was enlarged and used to hold additional fuel tanks. This raised the internal fuel capacity to 499 gallons from the 364 gallons on the standard Lim-5. The inboard wing fence was enlarged and wrapped around the wing leading edge to a position just in front of the main wheel well.

In addition, the rear fuselage was modified to accept SR rocket boosters, the main landing gear was completely redesigned with dual wheels and modified main wheel doors. The RV-2 radio altimeter antennas were moved from the wing to the underside of the fuselage along the aircraft centerline.

This new variant received the factory designation CM-11 and the first prototype CM-10-30 began testing on 2 July 1959 under Stanislaw Kruk. During testing it was discovered that the nosewheel needed to be strengthened due to the aircraft's increased gross weight.

Production of the CM-11 at Mielec was authorized under the designation Lim-5M and the first production aircraft (1F-01-01) rolled off the production line on 30 November 1960. There were a total of sixty aircraft built in three production batches with the aircraft being assigned to both Air Force and Navy units for operational evaluation.

The Lim-5M carried the same gun armament as the MiG-17F/Lim-5, a single N-37D cannon and two NR-23 cannons. Additionally, a single 250 kg (551 pound) bomb could be carried on the underwing D4-50 bomb rack instead of the usual underwing fuel tanks. The bomb rack could also carry the eight shot MARS-1 rocket pod which held eight S-5 rockets.

The Lim-5M had a take off run (with afterburner) of 710 to 770 meters (2,329 to 2,526 feet) which could be reduced to 350 to 370 meters (1,148 to 1,214 feet) if the optional SR rocket equipment was used. The landing run could be substantially reduced by the use of a braking parachute which was stowed in a container under the lower rear fuselage.

Lim-5MR

In addition to the standard Lim-5 and Lim-5M, a number of aircraft were produced by the WSK factory at Mielec as photographic reconnaissance aircraft under the designation Lim-5MR (R for *Rozpoznawczy* — Reconnaissance). These aircraft carried a single AFA-39 camera in a fairing under the nose on the port side.

An overall Natural Metal Polish Air Force Lim-5 (MiG-17F) (1C-14-14), Red 1414, climbs out over Poland. The aircraft is configured with two 400 liter (105.6 gallon) drop tanks. Poland began producing the MiG-17 during November of 1956.

Lim-6

The Lim-6 was an improved version of the Lim-5M designed to eliminate the short comings of the earlier aircraft. In order to reduce the landing roll, the braking parachute and its container were relocated from under the rear fuselage to a bullet shaped fairing at the base of the rudder. Tests had revealed that the parachute could, and often did, suffer damage when deployed from the old location eliminating the parachute's braking effectiveness. Additionally, the standard Fowler type flaps were replaced with blown flaps that used high pressure air bled from the engine. The center and outboard wing fence were slightly modified and the diameter of the air intake was slightly enlarged.

Flight testing revealed several problems with the Lim-6. During the first test flight with the Lim-6 prototype (CM-16-01) the engine suffered compressor stall. It was thought that the modified air intake caused the problem but even after some modification, the problem remained. It later was discovered that it was the bleed air system for the blown flaps that caused the compressor stall.

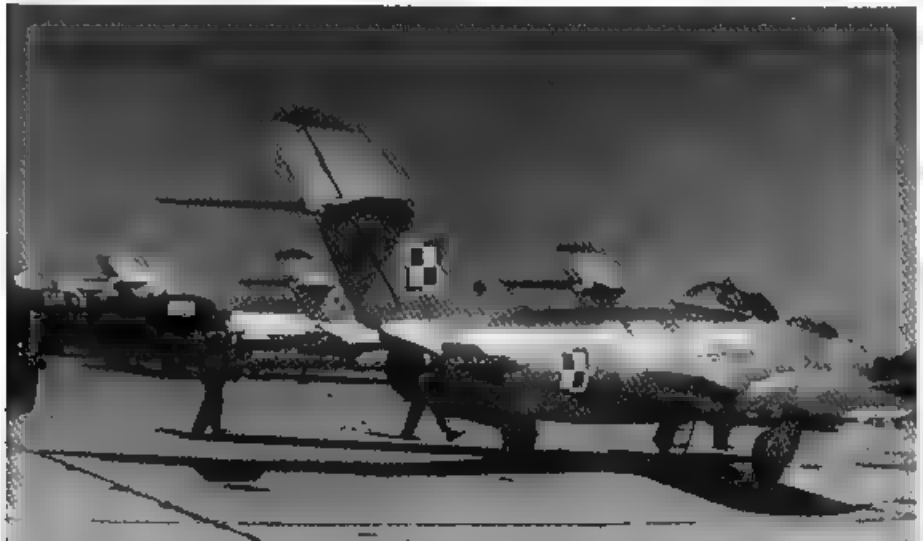
On later tests it was discovered that the turbine was prone to over heating. Flight tests with two production Lim-6s were also rather disappointing. The aircraft had poor elevator control and stability problems caused by the blown flaps and enlarged wing roots. Reports coming in from combat units evaluating the Lim-5M were also negative regarding the aircraft's flight characteristics, mainly caused by the enlarged wing roots.

There were a total of forty Lim-6 aircraft produced (1J-04-01 to 1J-04-40) but none of the aircraft ever reached front line units.

Lim-6bis

Trials with the Lim-5M and Lim-6 clearly showed that both types were far from ideal. The flight characteristics and especially the handling during takeoff and landing were simply too demanding for the average fighter-pilot. As a result, neither the Lim-5M or the Lim-6 were assigned to operational front line combat units and work was begun during 1962 to develop a new fighter-bomber variant of the Lim-5.

Polish Lim-5s take up positions on the runway for mass parade takeoff. The Red painted fin tip identifies the aircraft as part of the 1st Squadron. The fuel truck in the background is a Soviet built ZIS-150 fuel truck, widely used by WARSAW Pact forces.



The new variant reverted to the original MiG-17F wing and landing gear, modified with an underwing pylon being mounted on each inboard wing panel. The aircraft also was fitted with the bullet shaped SH-19 braking parachute container at the base of the rudder and RV-UV radio altimeter antennas on the under fuselage centerline.

The new variant received the designation Lim-6bis. Before series production of the new aircraft began, a number of earlier Lim-5M and Lim-6 airframes were converted to Lim-6bis standards. The first aircraft converted was a Lim-6 which left the WSK Factory at Mielec during March 1963.

The Lim-6bis underwing pylon was mainly used to carry a Polish manufactured MARS-2 rocket pod (although it could also carry bombs) and, as with the standard Lim-5 (MiG-17F), the underwing drop tank could be replaced by a D4-50 bomb rack for carrying bombs or rocket pods. The MARS-2 was a improved version of the Soviet UB-16-57-UD rocket pod which used the S-5 57MM unguided air-to-ground rocket. The use of the MARS-2 rocket pod made it necessary to install an ASP-4NM gun sight and the PO-4 rocket control panel in the cockpit of the Lim-6bis. Additionally, all Lim-6bis aircraft had the SRD-1M radar range finder antenna installed on the nose.

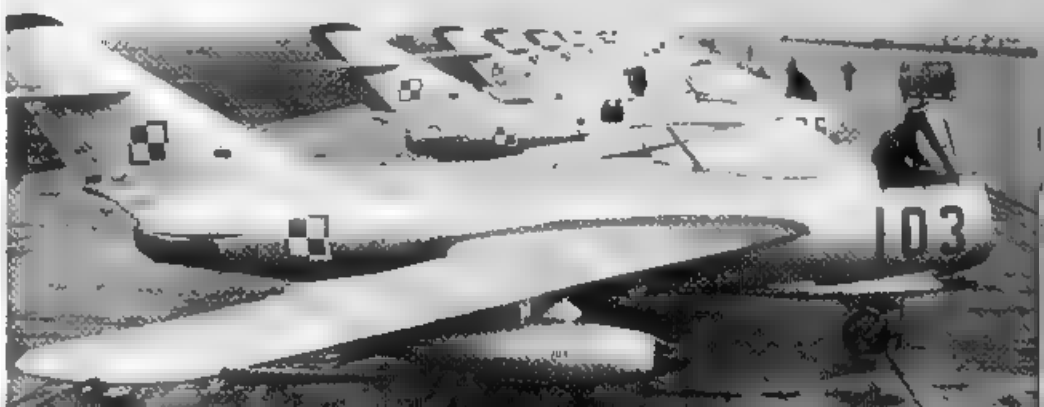
Once conversion work on the Lim-5M and Lim-6 airframes was completed two batches of new production aircraft were built for a total of seventy aircraft. The last Lim-6bis built (serial 1J-06-40) left the WSK-Mielec factory with the tactical number, Red 640, on 25 February 1964.

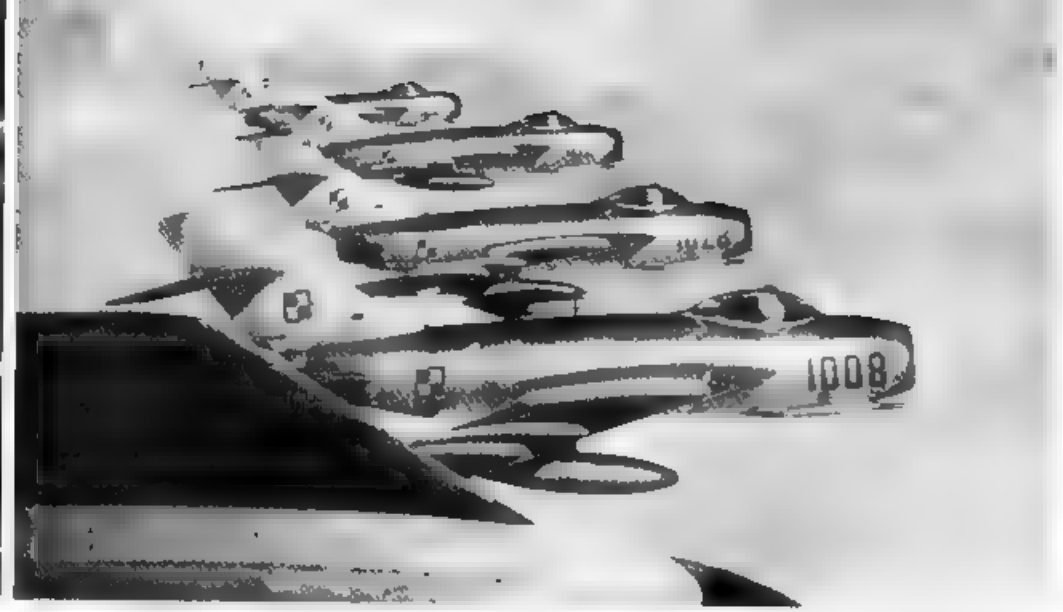
Initially, all Lim-6bis aircraft were delivered in Natural Metal. Later, during the mid-1970s, a tactical camouflage pattern was introduced. Over the years the Lim-6bis has carried a number of different camouflage patterns and colors. The Lim-6bis remained active in the Polish Air Force until mid-1992 when it was announced that the aircraft was being retired.

Lim-6R

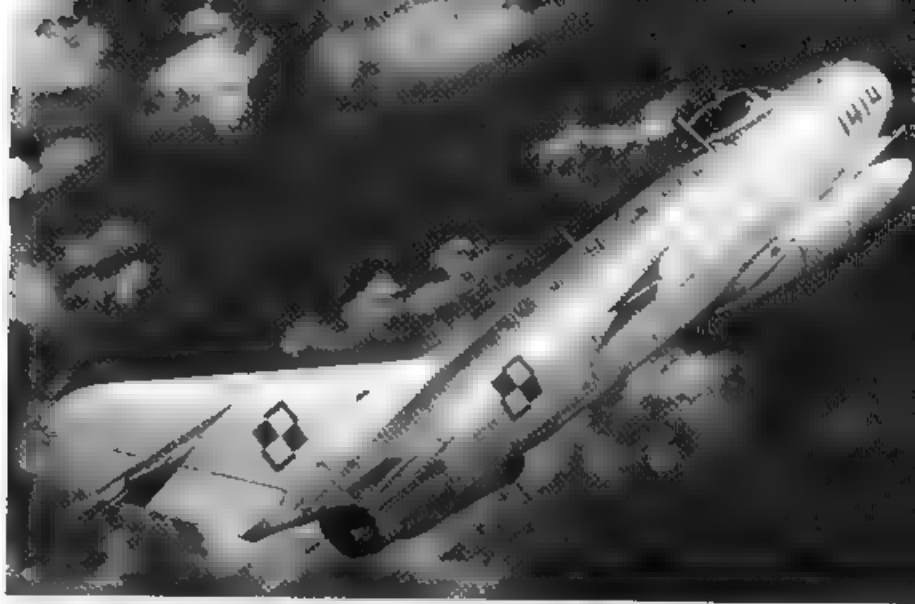
There were a number of Lim-6bis aircraft modified with an AFA-39 camera mounted in a fairing under the mid-fuselage for the photo reconnaissance role under the designation Lim-6R.

Ground crews carry out routine maintenance on Lim-5s on the flight line of a Polish Air Force base. The aircraft in the foreground, Red 103, came from the the first production batch (serial 1C-01-03). The tip of the drop tank and the fin tip are in Red.





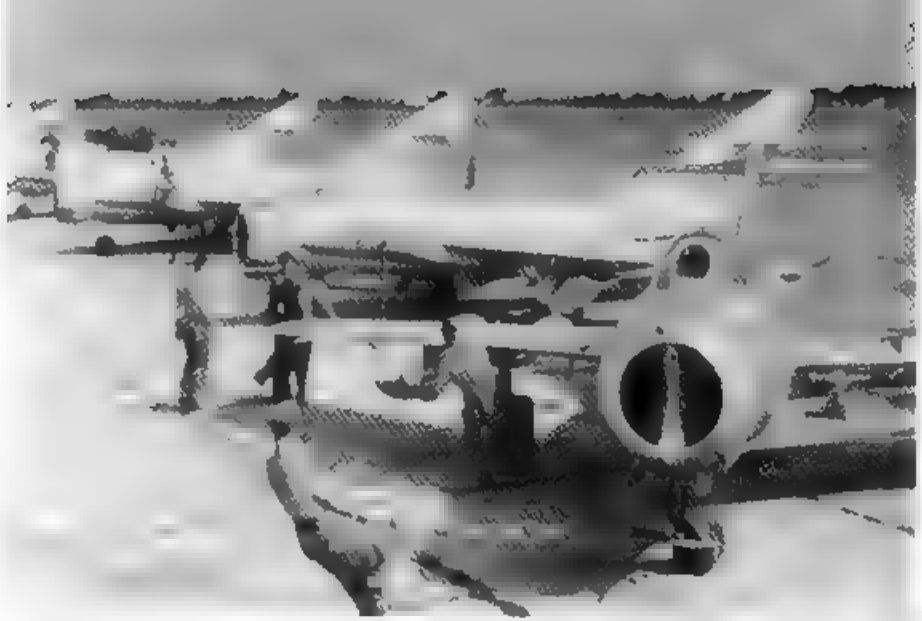
Four Polish Air Force Lim-5s form on the wing of a PAF MiG-15UTI Midget. These Polish-built MiG-17Fs carry an SRO-1 IFF antenna on the fuselage spine and a SRD -1M radar range finder antenna on the nose. PAF aircraft did not carry the national insignia on the wing upper-su[redacted].



This Lim-5 (1C-14-14) a late production aircraft from Production Block 14. There were a tota of nineteen Lim-5 production batches for a total of 477 aircraft built between September o 1956 and June of 1960.

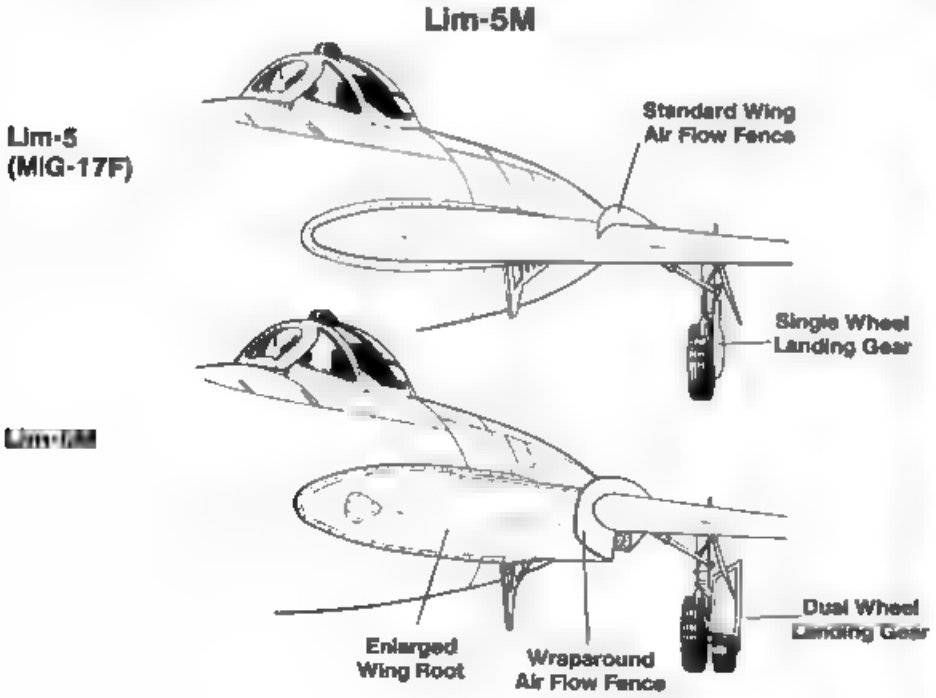
This experimental bomb rack was intended to allow the Lim-5 to be used for fighter-bomber missions. It was evaluated by the Polish Air Force but not put into production. The rack was configured with two 50 kg (110 pound) parachute retarded bombs. Parachute retarding allowed the Lim-5 to safely conduct low level missions.

A Lim-5M (1F-03-24), Red 324, is accepted by the pilot. The three digit tactical number was repeated on the enlarged wing fence. The Lim-5M used the enlarged wing root area to hold extra fuel tanks. There were a total of sixty Lim-5M built in three different production [redacted]



A Lim-2 (MIG-15) is moved out of its parking spot on the flight line. The second aircraft in line, Red 307, is a Lim-5MR reconnaissance fighter equipped with an AFA-39 camera fairing under the nose. The aircraft also has a FAB-50 (110 pound) practice bomb on the wing pylon.

The prototype Lim-6 (CM-16-01) was a further modification of the Lim-5M with a SH-19 braking parachute housing installed at the base of the rudder. Testing revealed that the aircraft had numerous problems and the Lim-6 was never issued to front line squadrons.



A lineup of overall Natural Metal Lim-6bis fighter-bombers. The first Lim-6bis aircraft were delivered without the underwing pylon for the MARS-2 pod. They were later sent back to Mielec for installation of the pylon and MARS-2 equipment. There were seventy Lim-6bis aircraft built, along with a number of aircraft converted from Lim-5M and Lim-6 airframes.

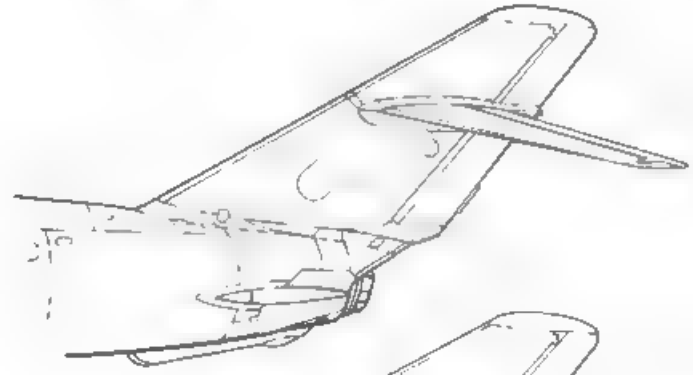
Natural Metal Lim-6bis fighter-bombers and Lim-5 fighters share the ramp at a PAF base during the mid-1970s. The Red vertical stabilizer tips on the first two aircraft identify them as belonging to the 1st squadron within the regiment.

This Lim-6bis (1J-06-26), Red 626, was part of the sixth and last production batch of Lim-6bis, built between late 1963 and early 1964. The aircraft has a very weathered camouflage finish but was still in active service with the 45th Fighter-Bomber Training Regiment at Babimost during the Summer of 1990.

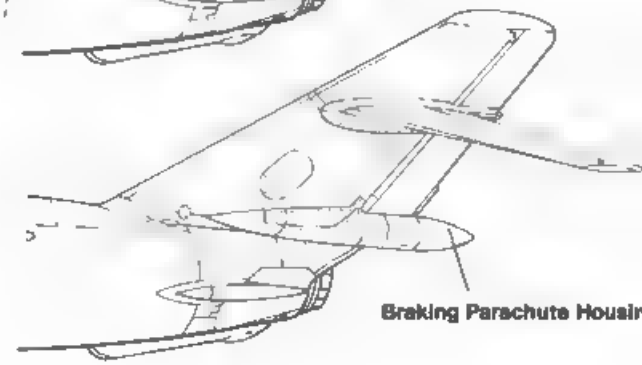
Red 101 was the first Lim-5M built, leaving the factory on 30 November 1960. It was later rebuilt to Lim-6bis standards with a SM-19 parachute housing and standard Lim-5 (MiG-17F) wing. During the Summer of 1990 the aircraft was still in operational service with the 45th *Lotniczy Pulk Szkolno-Bojowy* (45th Fighter Bomber Training Unit) based at Babimost.

Tail Development

Lim-5 (MiG-17F)

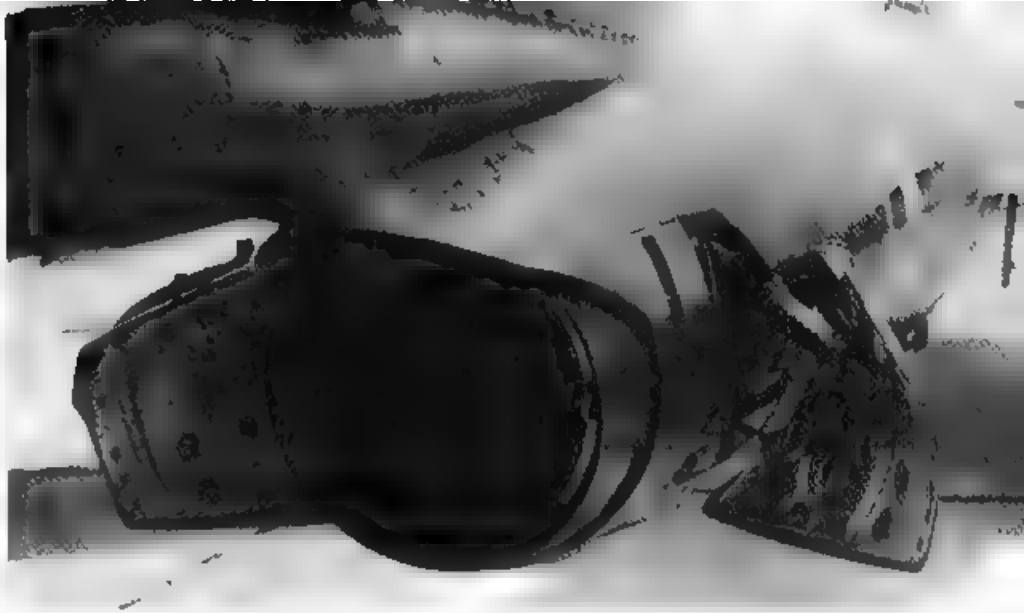


Lim-6



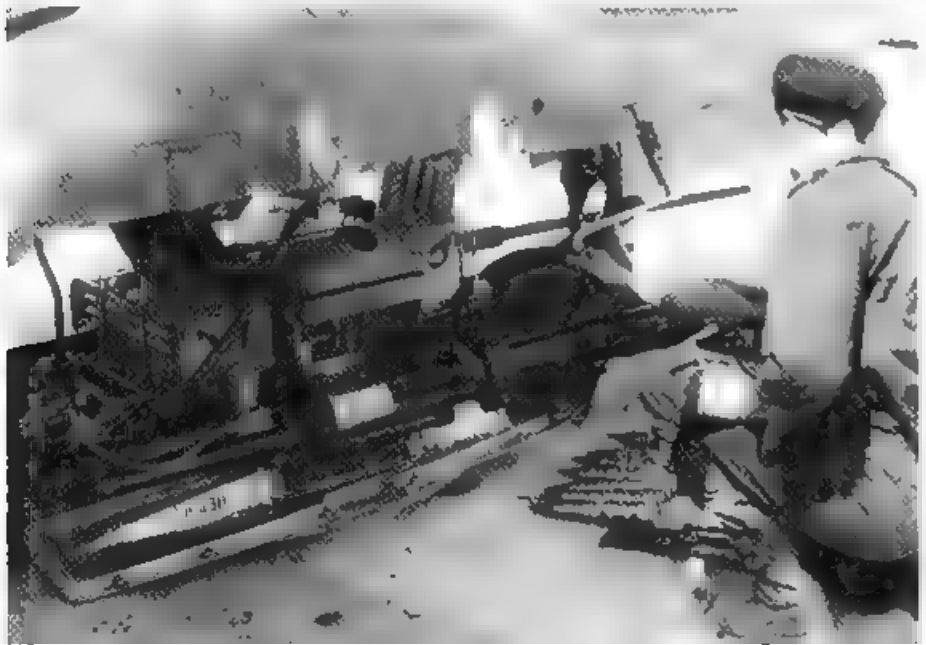
Braking Parachute Housing

This Lim-6bis, Red 431, has the entire rear fuselage removed to allow maintenance personnel access to the power plant. The engine was an improved version of the Klimov VK-1F afterburning turbojet built under license at WSK-Rzeszow.

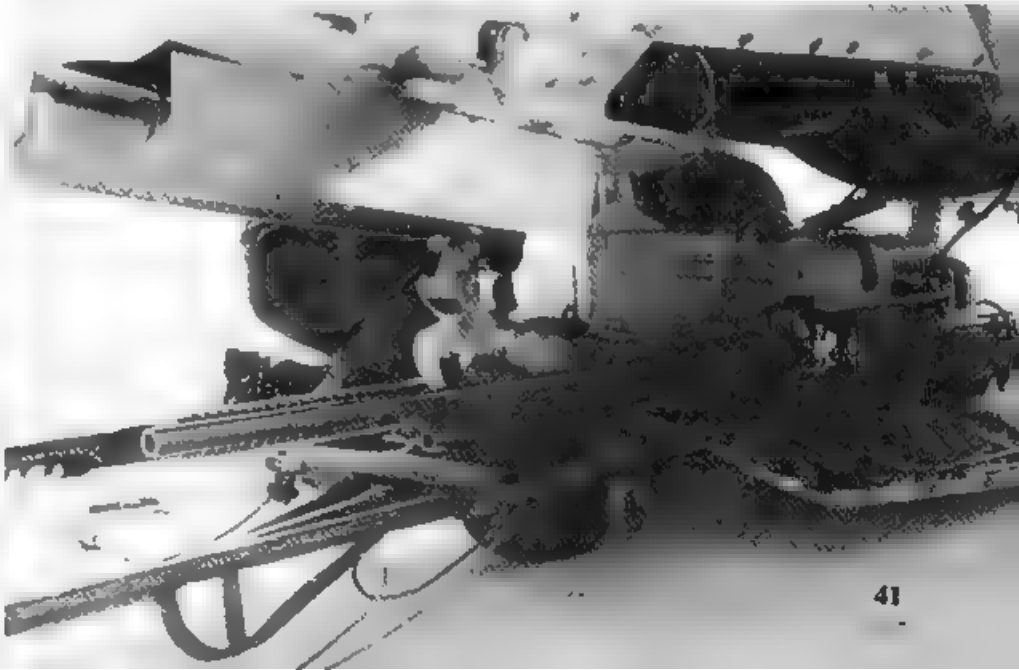


The open air brakes on this Lim-6bis reveal the round holes in the structure intended to lighten the component. The Lim-6bis air brake was the same as the standard MiG-17F Fresco C and was hydraulically activated. The interior of the air brake is in Natural Metal.

Ground crews rearm a PAF Lim-6bis (1J-04-38), Red 438. The gun platform is lowered by a hand crank turned by the mechanic. Just in front of his knee is a belt of 37mm shells for the N-37D cannon, while the two boxes on the gun platform each hold eighty rounds of ammunition for the N-23 cannon.



The port side of the gun platform holds the two NR-23 cannons in a staggered position. The NR-23 weighs 37 kg (81.5 pounds) and each NR-23 has an ammunition supply of eighty rounds stored in the boxes between the NR-23s and the N-37D cannon.



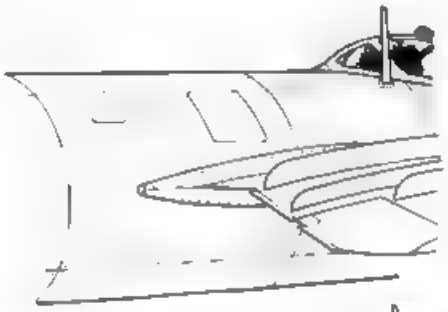
An overall Natural Metal Lim-6R reconnaissance fighter on the taxiway during a winter exercise. This was the last Lim-6bis built and was converted to the reconnaissance role during 1964. It was also the last MIG-17 derivative built anywhere in the World, since Chinese and Soviet production had closed during the late 1950s.

A Lim-6bis, Red 626, on the flight line of the 45th Fighter-Bomber Training Regiment at Babimost. At this time the unit was under the command of COL Miroslaw Kasper. As was standard with PAF aircraft, no national markings were carried on the wing uppersurface.

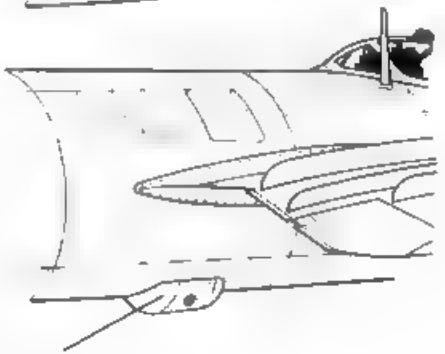
A PAF Lim-6R, Red 625 reconnaissance fighter. The fairing for the camera was mounted under the fuselage and contained an AFA-39 camera. Until the mid-1970s the Lim-6Rs were flown in an overall Natural Metal finish. After that time they received a tactical camouflage better suited to their low level tactical reconnaissance role.

Lim-6R

Lim-6bis



Lim-6R



AFA-39 Camera Pod

Radar Equipped Variants

SP-2

The SP-2 (P for *Pouskovjj* — Search) prototype was an all weather interceptor variant of the MiG-17. The MiG-OKB began development of the SP-2 to meet a requirement issued by Marshall Govorov of the Air Defense Forces (PVO). This requirement, issued during 1949, called for a fighter that could operate at night and under all weather conditions. The requirement stated that the interceptor should be able to detect, intercept and destroy a target without gaining visual contact.

The SP-2 prototype (like the earlier SI-2 and SI-02 prototypes) was a MiG-15 airframe converted to MiG-17 standards. The nose was further modified to accept a *Korshun* (Vulture) air intercept radar, with a large dielectric radome being mounted mounted on the upper lip of the air intake. Initially, the SP-2 carried neither armament nor a RV-2 radio altimeter.

The SP-2 flew for the first time in March of 1951 with Grigoriy Sedov at the controls and, since the radar was not ready for installation, the aircraft was flown with an equal amount of ballast in the nose. Factory tests lasted until November of that same year with the State Acceptance trials beginning on 28 November 1951. These tests involved pilots of both the Flight Research Institute (LII) and the Air Defense Forces (PVO).

When the *Korshun* radar system became available it was installed and flight testing continued. The radar had been developed by a team under the leadership of Andrejeja Slepushkin and was based on the use of a single antenna for both search and tracking. The radar was operated manually in the tracking mode and proved difficult to use since the pilot was also busy with navigation and flying the aircraft.

The radar installation made it necessary to relocate the S-13 gun camera to the starboard side of the nose. Due to the radar's heavy weight, the aircraft's armament was reduced to two NR-23 cannons. During its factory flight testing a number of improvements were made including the addition of an SRO-1IFF blade antenna on the fuselage spine and RV-2 radio altimeter antennas was on the wing undersurfaces.

SP-7

The SP-7 was a competitor to the *Korshun* equipped SP-2 prototype. The main difference between the SP-2 and SP-7 was the different radar system in the SP-7. The *Izumrud* (Smaragd) radar system, developed by a team under leadership of Viktor Tikhomirov, used a two antenna system, with each antenna having a different function. One antenna was for search and the other for target tracking. This had the advantage that the tracking of a target was automatic rather than manual.

In order to accommodate the radar scope and other instruments in the cockpit, the windscreen was move forward and given a greater rake. The lip radome above the air intake housed the search antenna, while the tracking antenna was housed in a larger radome mounted in the center of the intake splitter plate. The RP-1 radar was able to detect targets at twelve kilometers (7.45 miles) range and when the target was within a range of two kilometers (1.25 miles) the radar switched automatically from search to track. The radar scope was mounted in the center of the instrument panel. In addition to the radar scope, the cockpit instrument panel had a Green light which was illuminated when the target was within 3,000 meters (9,842 feet) and a Red lamp which came on if the pilot approached closer than 500 meters (1,640 feet). The Red lamp was a warning that the target is too close. The radar worked in conjunction with the ASP-3N optical gun sight.

The modified SP-2 prototype had an SRO-1 IFF blade antenna, rudder trim tab and gun blast panel on the nosewheel door. It also carried an RV-2 radio altimeter antenna on the wing tip. The aircraft is equipped with the early MiG-15 type nosewheel. The State Acceptance trials lasted until 29 December 1951.

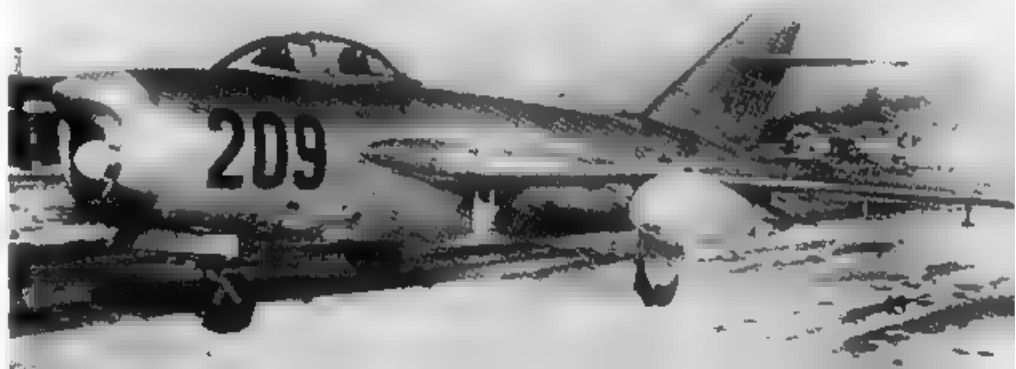
The armament consisted of three NR-23 cannons with 100 rounds per gun. The cannon fairings and shell ejector blisters were smaller than on the MiG-17F. The SP-7 did not carry a rear view mirror above the cockpit, but had heating tubes installed in the rear canopy glass. As with the SP-2 prototype, the S-13 gun camera was relocated to the starboard side of the nose.

There were a few SP-7 aircraft built and assigned to both the Soviet Air Defense Forces (PVO) and Soviet Navy under the designation MiG-17P (P *Pouskovjj* — Search). NATO assigned the SP-7/MiG-17P the ASSC Reporting Name of Fresco B, while the SP-2 prototype was never detected and received no ASCC name.

MiG-17PF Fresco D

While the MiG-17P (Project SP-7) proved to be a valuable all weather interceptor, the weight of the RP-1 *Izumrud I* radar system reduced its rate of climb considerable. When

This MiG-17P Fresco B, Red 209, was one of the few production aircraft to see active service. The aircraft was equipped with a rear view mirror on the canopy but was fitted with a MiG-15 type ejection seat. The aircraft is unusual in that it carries slipper type underwing tanks.



the VK-1F afterburning turbojet became available during 1953, the MiG-OKB immediately set to work to redesign the MiG-17P to accommodate the new power plant under the MiG company designation SP-7F. When the aircraft completed testing and passed state acceptance, it was placed into production under the designation MiG-17PF.

Production of the MiG-17PF was a given high priority since it was the first Soviet fighter capable of defending Soviet airspace around the clock, however, because of the insufficient number of ground radar stations (Ground Control Intercept — GCI) to direct the aircraft close enough to their targets for their onboard radar to be effective, the effectiveness of the MiG-17PF was considerably reduced.

There were a number of differences between the MiG-17F day fighter and the MiG-17PF. The S-13 gun camera fairing was relocated from the top of the air intake to the starboard side of the nose. The large N-37 cannon was deleted and the starboard NR-23 cannon had a very small fairing. The three NR-23 cannon had an ammunition supply of 80 rounds per gun and the shell ejection blister fairings were changed in shape. While the MiG-17F had a single piece gun blast panel on the nose, the MiG-17PF used a two piece gun blast panel.

The MiG-17PF had an internal fuel capacity of 368 gallons, six gallons less than the MiG-17F. The empty weight of the MiG-17PF increased to 9,220 pounds some 556 pounds heavier than the MiG-17F and the takeoff run increased to 2,839 feet, 946 feet longer than a MiG-17F.

The oval access panel on the port side of the fin was bigger than the access panel on the MiG-17F and the MiG-17PF carried no Sirena 2 tail warning radar warning antenna. The FKSR-46 signal flare dispenser was relocated slightly to the rear on the starboard fin.

There were some changes made during the MiG-17PF's production cycle. Early production batches were all fitted with the RP-1 (NATO Reporting Name Scan Can) but, starting with the twenty-fifth aircraft in the sixth production block, the aircraft were equipped with the improved RP-5 *Izumrud 5* radar (NATO name, Scan Odd). While the first production batches used a two piece gun blast panel, late production aircraft were all equipped with a single piece gun blast panel. Some late MiG-17PFs were also equipped with a pitot tube on starboard side of the nose and a small aerial above the starboard NR-23 cannon fairing.

The first MiG-17PF were spotted by NATO observers during the Summer of 1956 in Hungary. The aircraft was than given the ASCC Reporting Name, Fresco D. A number of early RP-1 equipped MiG-17PF were delivered to members of the WARSAW Pact, including Bulgaria, Czechoslovakia and Poland. The late production MiG-17PF was delivered to all members of the WARSAW Pact to provide these countries with an all weather interceptor. Since there were few MiG-19PM Farmer all weather fighters delivered to WARSAW Pact members to replace their MiG-17PFs, the Fresco D remained in front line service until replaced by the MiG-21F-13 Fishbed C.

The MiG-17PF was also delivered to a number of Soviet client states, particularly in the Middle East. Other countries that also received the MiG-17PF include Indonesia and North Vietnam.

Lim-5P

During 1958, Poland received a number of early production MiG-17PF Fresco Ds (Scan Can radar) from the Soviet Union, assigning these aircraft to both Air Force and Navy units. These were the first all weather interceptor fighters to enter Polish service.

License production of the MiG-17PF in the WSK factory at Mielec was initiated under the designation Lim-5P and these aircraft were all equipped with the RP-5 *Izumrud 5* (Scan Odd) radar. The first Lim-5P rolled off the production line on 18 January 1959 and there were a total of six production batches (129 aircraft) built. The last Lim-5P (serial 1D-06-41) was delivered on 29 December 1960.

The first production batches all had the early two piece gun blast panel while Lim-5Ps of the fifth and sixth production batches had the later single piece gun blast panel. During their operational careers, a number of Lim-5Ps were retrofitted with the more advanced RV-UM radio altimeter. These replaced the standard RV-2 radio altimeter.

This Soviet Air Force MiG-17PF Fresco D, Blue 09, is unusual in that it carries a radio antenna wire running from the fin to a post near the cockpit. This antenna wire was rarely carried on MiG-17PFs.

The MiG-17PF was the first all weather interceptor to serve with the air forces of the WARSAW Pact. These MiG-17PFs, Red 838 and 850, of the Hungarian Air Force share the ramp with a MiG-21F-13, Red 806 during the mid-1960s. The first MiG-17PFs were delivered to Hungary during 1956.

antennas on the wing undersurfaces. A number of Lim-5Ps were also converted to the reconnaissance role mounting a AFA-39 camera fairing under the fuselage.

A number of Lim-5P were exported to the German Democratic Republic, but these aircraft carried the Soviet designation MiG-17PF in German service, even through they were built in Poland.

Lim-6M

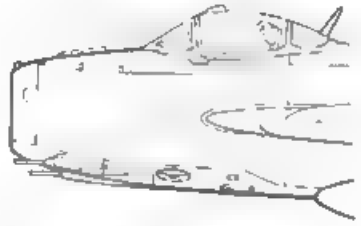
During the 1960s, the MiG-17PF had been largely replaced by the more advanced and effective MiG-21 Fishbed. As a result, the Lim-5P was declared obsolete for interceptor duty and in 1971 a decision was made to convert the remaining Lim-5P airframes to fighter-bomber role.

The RP-5 radar and associated equipment was removed, but the radomes were retained. An ASP-4NM gun sight and a PO-4 rocket control panel were installed in the cockpit and an underwing pylon was mounted under each inboard wing panel. In contrast to the Lim-6bis, the Lim-5P conversions carried no SH-19 braking parachute housing. The conversions received the designation Lim-6M and all were delivered from the factory in a camouflage finish.

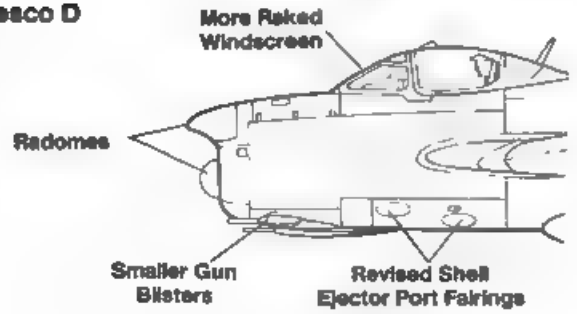
When the Defense Test and Support Evaluation Agency (DTSEA) began to purchase Eastern block aircraft, at least two Lim-6Ms were among the aircraft acquired. When these aircraft took part in their first (and only) exercise at Kirtland AFB, New Mexico during the Fall of 1988, they carried the underwing pylons but no MARS-2 rocket pods.

Nose Development

MiG-17F Fresco C



MIG-17F Fresco D



J-5A

Besides producing the J-5 (MiG-17F) at the Shenyang Aircraft Factory, the Chinese also produced the MiG-17PF all weather fighter under the designation J-5A. As in the case with the J-5, all of the documentation, tooling and equipment had been delivered by the Soviet Union and the Chinese produced aircraft is virtually identical to the Soviet MiG-17PF.

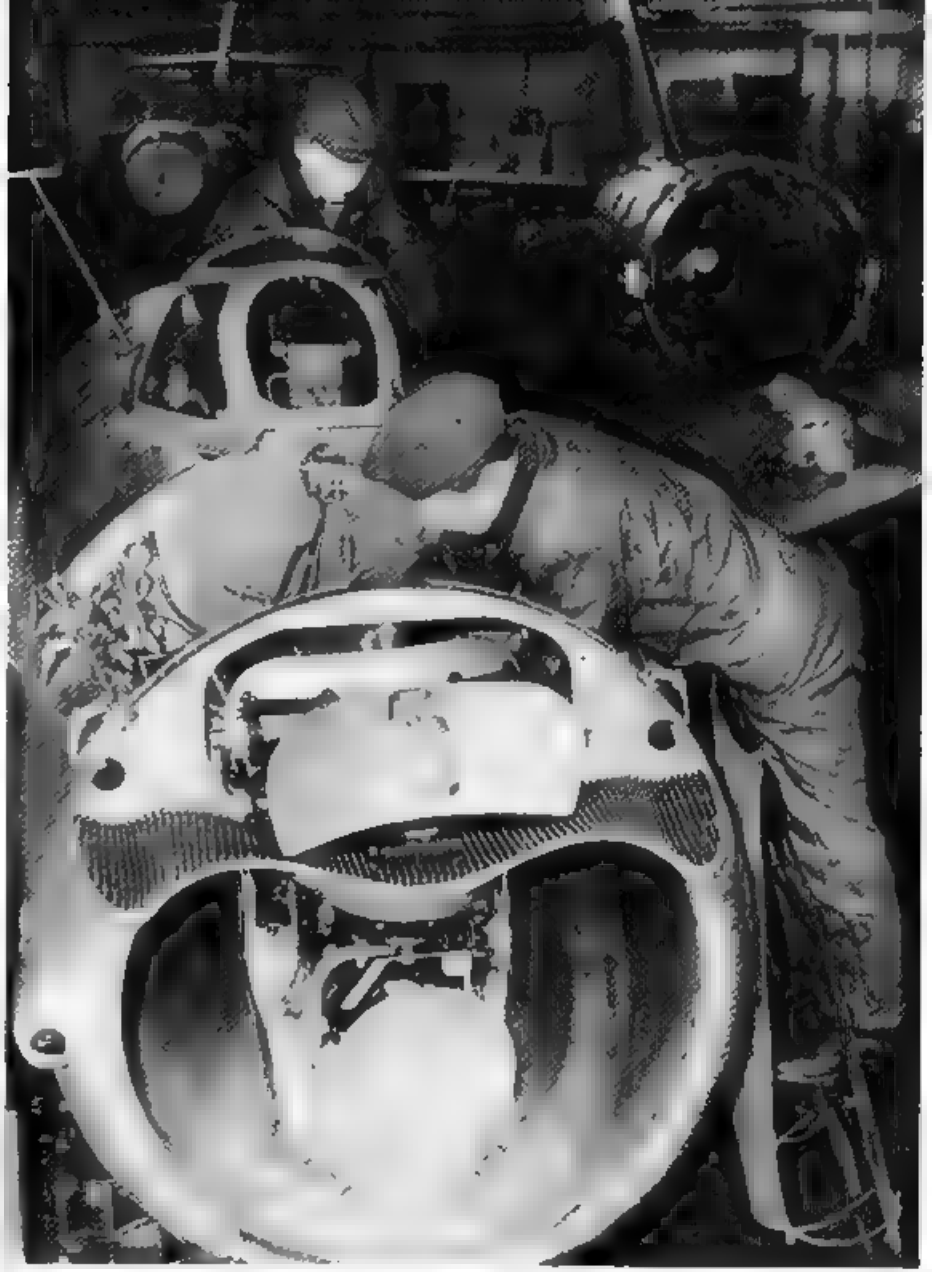
Production of the J-5A was assigned to the Chengdu Aircraft Factory and the work on the first prototype began in May of 1961 (with considerable help from specialists from the Shenyang Aircraft Factory). A full set of production drawings was completed by the Chengdu Aircraft Factory in September of 1962 and component manufacture started in March of 1963. Static tests were completed in September of 1964 and the first flight of the J-5A prototype took place on 11 November 1964 at the Yanliang Airfield.

Once the flight tests were completed and the operational and tactical performance was approved, the J-5A was certificated for mass production by the Military Products Certification Commission in December of 1964. The following year the mass production of the J-5A commenced. The J-5A became the Peoples Liberation Army Air Force's first all weather fighter. Later, a number of J-5As were reportedly exported to North Vietnam.

An East German Air Force MiG-17PF, Red 420, parked on its hardstand with the canopy covered and a starter cart in place next to it. The MiG-17PF did not carry a Syrena 2 tail warning radar.

The Romanian Air Force received its first MiG-17PFs during 1956. The aircraft on the left is carrying a three digit tactical number, while the other aircraft carries a four digit tactical number Romania applied the national markings on both the fin and rear fuselage. Red 413 has a Yellow center radome and Red 0904 has a Light Gray radome, but both aircraft have the upper radome in Olive Drab.

A lineup of overall Natural Metal Czech Air Force MIG-17PFs. The Czech Air Force received its first Fresco Ds during 1955. Czech aircraft carried the tactical number on the rear fuselage in Black and national insignia on the wing uppersurface. The access panel on the fin is much larger on the MIG-17PF than on the MIG-17F.



Maintenance personnel work on the radar system of a MIG-17PF Fresco D. The RP-5 radar (Scan Odd) operated on the two antenna principle, with one used for tracking and the other for search. The upper antenna was the search radar, while the lower conical scan radar automatically began to work at a distance of 2 km (1.25 miles).

This Lim-5P (1D-06-09) was the ninth aircraft of the last Fresco D production batch and was delivered during late 1960. This aircraft was equipped with a camera pod under the nose for an AFA-39 camera.

Ground crews service the armament on a Soviet Air Force MiG-17PF, Blue 40, during a winter exercise. The fairing below the fuselage is believed to be a fairing for reconnaissance camera equipment. This is a late production MiG-17PF with a single piece gun blast panel.

A few East German MiG-17PFs were camouflaged with Earth Brown/Olive Drab uppersurfaces over Light Blue undersurfaces, although the four digit tactical number was not used operationally. This aircraft was later put on display at Cottbus, home base for the 1st Fighter Regiment.

The Lim-6M (1D-04-18) had the radar system removed and an underwing pylon for the MARS-2 rocket launcher installed under each wing. The conversion of obsolete Lim-5Ps began during 1971. In contrast to the Lim-6bis conversion, the Lim-6M had no SH-19 braking parachute installed.

MiG-17PM Fresco E

The MiG-17PM (MiG-OKB designation SP-9) became the first Soviet interceptor fighter equipped solely with air-to-air missiles. This practice followed a trend started by the Americans. In the late 1950s it was believed by many that future fighter aircraft should only be armed with air-to-air missiles which could destroy enemy aircraft at far greater ranges than was possible with aircraft guns and cannons.

The first Soviet built air-to-air missile was the RS-2U (AA-1 Alkali), a beam riding missile which consisted of a fuse and warhead (first section), the steering fins and autopilot (second section), rocket engine and batteries (third section), stabilizing fins and pneumatic system (fourth section) and radio controls (fifth section). The RS-2U weighed 83.5 kg (184 pounds), had a speed of 1,650 kmh (1,025 mph) and the warhead was equipped with a proximity fuse.

The AA-1 Alkali was equipped with a simple semi-active radar guidance system that homed on the radar energy from the beam generated by the carrier aircraft. If the AA-1 did not hit the target after twenty-three seconds of flight it would self-destruct. When the proximity fuse detonated the warhead close to the target, the explosion produced some 830 fragments, shredding the target.

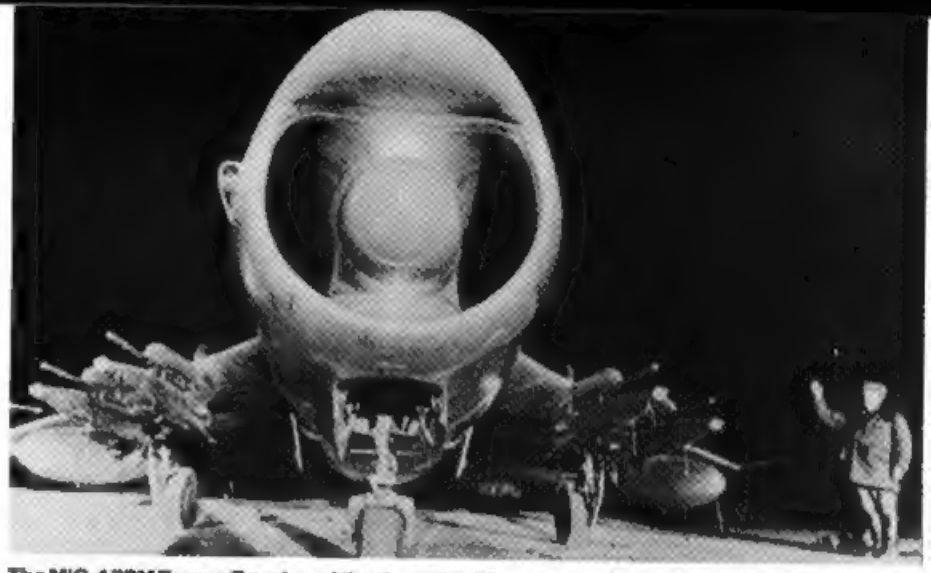
There were only a limited number of MiG-17PM produced for use by the Air Defenses Forces (PVO) and when Western observers first spotted the missile armed MiG-17 during 1958, NATO assigned the ASCC Reporting Name Fresco E to the MiG-17PM.

There were a number of changes between the cannon armed MiG-17PF Fresco D and the missile equipped MiG-17PM Fresco E. The three NR-23 cannons, gun blast panels and shell ejection blisters were deleted and the openings faired over; however, the aircraft retained the S-13 gun camera on the starboard side of the nose. Two APU-4 missile rails were mounted on each wing to carry the AA-1 Alkali missiles.

The RP-5 Scan Odd radar used on the MiG-17PF was replaced by an RP-2U *Izumrud 2* radar system. This system was quite similar to the Scan Odd except that it had an increased scan range (2,000 meters for the RP-5 and 3,500 meters for the RP-2U). A Green light was installed in the cockpit that flashed when the target was between 3,500 and 1,500 meters. A Red lamp flashed when the target was within 2,000 meters, which was too close for a successful missile firing.

Since the AA-1 Alkali was a beam rider, the MiG-17PM pilot had to illuminate the target until missile impact. Any evasive maneuvers would break the lock-on and the missile would go ballistic. Multiple missiles could be launched using the same illumination beam.

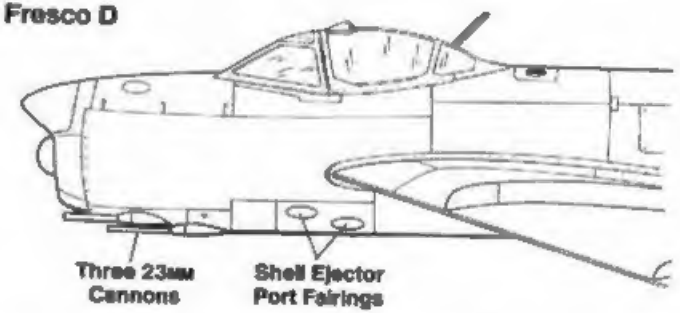
The AA-1 Alkali could be fired at ranges between 1,950 and 7,000 meters (6,397 to 22,966 feet) from the designated target. It could been used at altitudes ranging between 700 and 16,600 meters (2,296 to 54,462 feet). Due to the conical shape of the radar beam, accuracy deteriorated rapidly the farther the missile was from the carrier aircraft.



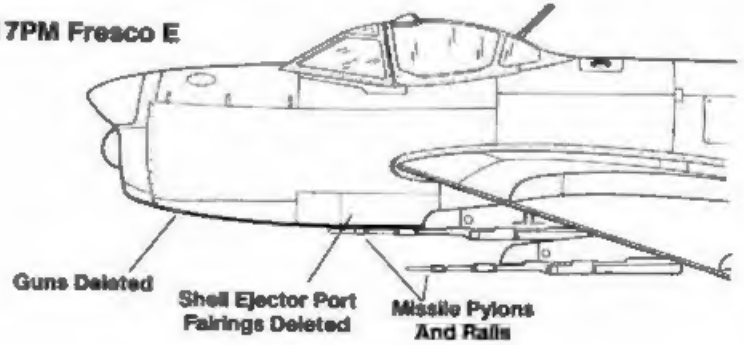
The MiG-17PM Fresco E replaced the three NR-23 cannon with four underwing APU-4 missile rails for RS-2U beam riding air-to-air missiles (AA-1 Alkali). The guns, shell ejector port fairings and gun blast panel were all deleted, although the aircraft still carried a S-13 gun camera on the starboard side of the nose.

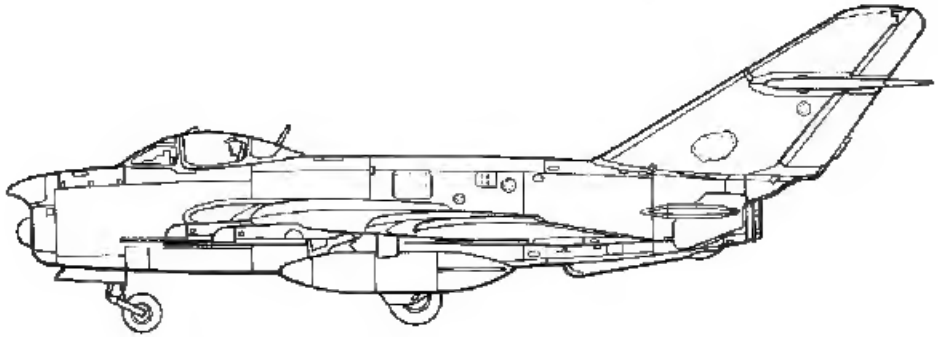
Armament Development

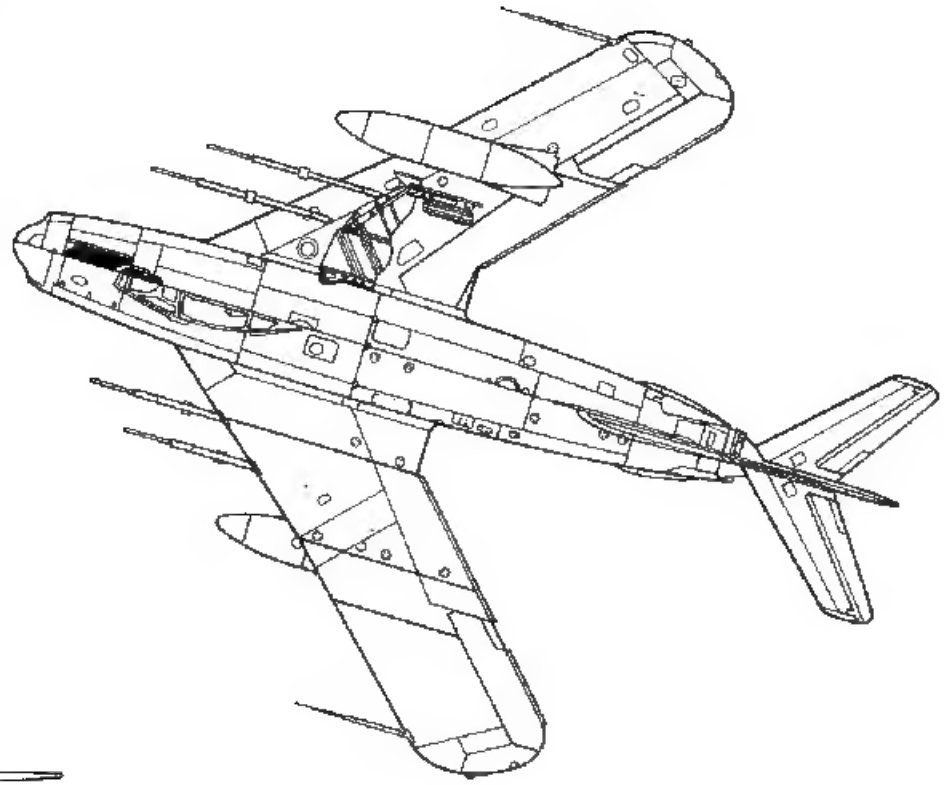
MiG-17PF Fresco D



MiG-17PM Fresco E







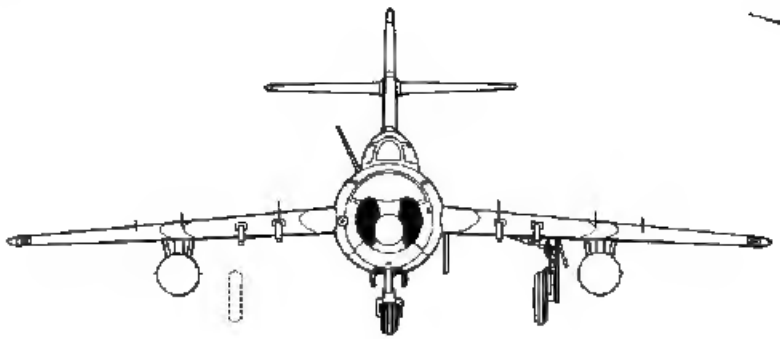
Specifications

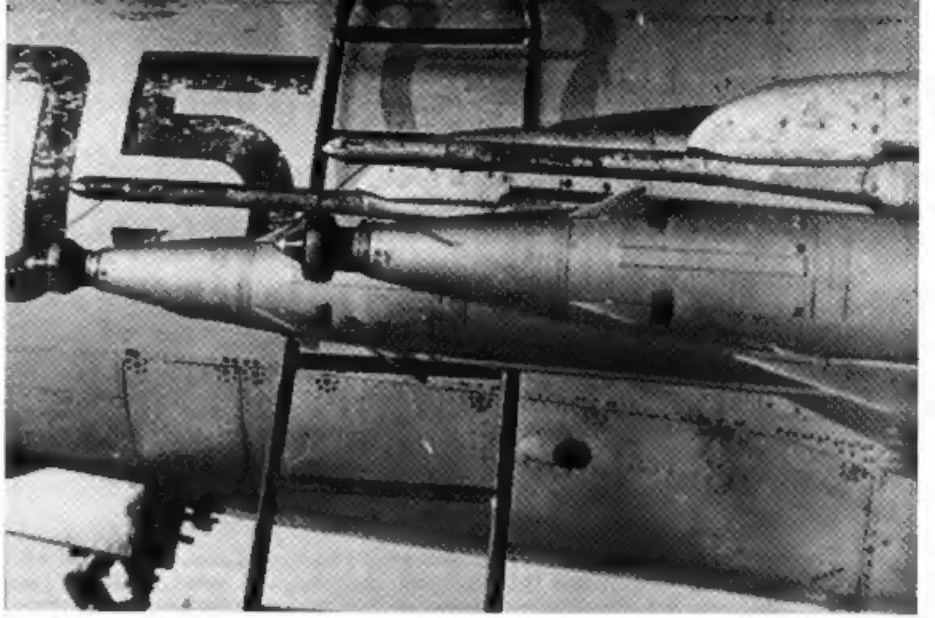
MiG-17PM Fresco E

Wingspan ..... 30 feet 10 inches
Length ..... 37 feet 6 inches
Height ..... 12 feet 3 inches
Empty Weight ..... 8,962 pounds
Maximum Weight ..... 14,445 pounds
Powerplant ..... One 7,452 lbst afterburning turbojet

Armament ..... Four RS-2U (AA-1) Alkai air-to-air missiles

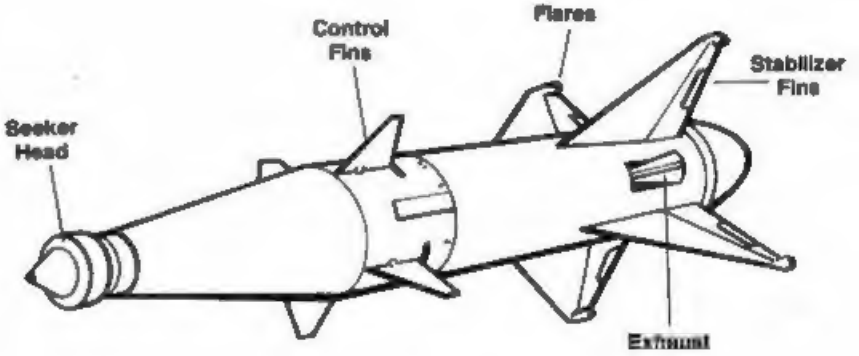
Performance
Maximum Speed ..... 698 mph
Service ceiling ..... 52,296 feet
Range ..... 1,075 miles
Crew ..... One





A pair of RS-2U (AA-1) air-to-air missiles on the wing pylons of a MiG-17PM Fresco E. The AA-1 Alkali weighed 183 pounds and was equipped with a proximity fuse. The missile could be launched at ranges between 1.9 and 7 Kilometers (1.1 and 4.3 miles) but a launch at under two km (1.24 miles) was considered dangerous.

AA-1 Alkali (RS-2U)



A ground crewman removes the protective covers from the RS-2U missiles on a Soviet Air Force MiG-17PM, Red 09. The MiG-17PM was equipped with the RP-2U *Izumrud 2'* radar system which differed from the RP-5 in having radio command guidance equipment for the AA-1 Alkali missiles.

A pair of Afghan Air Force MiG-17 Fresco A fighters attack rebel positions with cannon fire. The MiG-17 formed the backbone of the Afghan ground attack squadrons until it was replaced by the Sukhoi Fitter.

A MiG-17F Fresco C of the Egyptian Air Force pulls up after attacking an Israeli Army convoy during the Six Day War. This Fresco has been modified with bomb racks under the forward fuselage and rocket rails under the wings.

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